DOCUMENT RESUME

ED 206 471 SE 035 512

AUTHOR Maier, Judy
TITLE Man's Influence on the Sea: A Study Guide for the Sixth Grade. Alaska Sea Week Curriculum Series. Draft.
INSTITUTION Alaska Univ., Fairbanks. Alaska Sea Grant Program.
SPONS AGENCY National Oceanic and Atmospheric Administration (DOC), Rockville, Md. National Sea Grant Program.
PUB DATE Jun 80
GRANT NOAA-NA79AA-D-00138
NOTE 84p.: For related documents, see SE 035 506-511. Contains occasional light and broken type.

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Conservation (Environment); *Conservation Education; Ecology; Elementary Secondary Education; *Environmental Education; Grade 6; *Land Use; *Oceanography; Outdoor Education; *Science Education; *Social Studies

ABSTRACT

Presented are activities designed to help students understand and investigate relationships between people and the marine environment. Topics include personal values, coastal development and management, environmental laws, and beach community monitoring. General considerations are handled through simulations, class discussions, interviews, student writing exercises, and other classroom activities. Specific local studies involve field work as well as in-class preparation and evaluation. A bibliography, student worksheets, and field trip suggestions are included. (Author/WB)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED206471

Alaska Sea Grant Program

## ALASKA SEA WEEK CURRICULUM SERIES
## SIXTH GRADE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
AUG 1981
ERIC / CRESS
RECEIVED

# MAN'S INFLUENCE ON THE SEA

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Brenda Melteff

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE 035 512

UNIVERSITY OF ALASKA

# MAN'S INFLUENCE ON THE SEA

A Study Guide for the Sixth Grade

The materials in this section were originally written by:
Judy Maier

Supporting materials developed by:
Juneau Teachers and the South East Regional Resource Center

Edited by:
Jill Thayer
Alaska Sea Grant Program, University of Alaska

ALASKA SEA WEEK CURRICULUM SERIES

Field-test edition March 1980
First reprint June 1980

ACKNOWLEDGEMENTS

Sea Week began in the early 1970's in Juneau, Alaska. Under the leadership of Mary Lou King, parents, teachers and agency personnel started taking elementary school students down to the sea every spring. Soon, Sea Week was an annual event with some of the junior high and high school students assisting the younger pupils on their field trips to beaches, wetlands, forests and glaciers. In 1978, a K-6 Sea Week curriculum was written with the assistance of Juneau teachers, scientists, fishermen, parents, and government employees - a true community effort. In 1979, the Southeast Regional Resource Center revised the material, adding worksheets and graphics and reworking certain activities. In 1980, endorsed as "The Year of the Coast" by President Carter, it seems very fitting that the Alaska Sea Grant Program is initiating a program to spread Sea Week statewide.

This first statewide edition is a product of Juneau - its people and environment. We would like to express our deep appreciation to the many foresighted people who contributed to Sea Week and especially to all the students who are the reason and impetus behind its success. Special thanks to Mary Lou King, Nancy Barr, Janie Cesar, Carol Koski, Dick and Betty Marriot, Virginia Eggert, Claudia Kelsey, Kathy Hanna, James G. King, Lynn Szepanski, Karen Gunstrom, Mary Beth Parsons, Dan Hopson, Kristi Kantola, Pat Thrasher, Tamara Smid, Judy Maier, Jerry Hard, Marty Early, Jan Conner, Mark Hansen, the Alaska Department of Fish and Game, the Alaska Coastal Management Program, the United States Forest Service, the Alaska Department of Environmental Conservation, the United States Fish and Wildlife Service, and the South East Regional Resource Center.

Revision and publication of the Alaska Sea Week Curriculum Series is sponsored by the Alaska Sea Grant Program, cooperatively supported by NOAA, National Sea Grant College Program, U.S. Dept. of Commerce, under grant number NA79AA-D-00138, and by the University of Alaska with funds appropriated by the State of Alaska.

This reprinting is supported in part by Federal Coastal Zone Management Program Development funds (P.L. 92-583, Sec. 306) granted to the State of Alaska by the Office of Coastal Zone Management, National Oceanographic and Atmospheric Administration, U.S. Dept. of Commerce.

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| Preface | | |
| Introduction | | |
| Objectives | | |
| Unit 1: What is the Marine Environment | | 1 |
| Unit 2: Values of the Marine Environment | | 3 |
| Unit 3: Planning for wise use of Marine Environment | | 9 |
| Unit 4: Studying Local Development Site | | 12 |
| Recommended films and books | | 22 |
| Worksheets | | 23 |
| Appendix I | Steps to Organizing a Sea Week in Your Community | A-1 |
| Appendix II | Suggested Field Trips | A-2 |
| Appendix III | What to do on the Bus | A-3 |
| Appendix IV | Conservation | A-4 |
| Appendix V | Check List | A-6 |
| Appendix VI | Suggested On-site Organization | A-8 |
| Appendix VII | Look at the Beach | A-9 |
| Appendix VIII | Tides | A-13 |
| Appendix IX | Bibliography of Helpful References | A-14 |
| Evaluation Sheet | | |

# PREFACE

The Alaska Sea Week Curriculum Series (K-6) emphasizes one or more aspects of the marine environment at each grade level. Kindergarten materials, for instance, are intended to introduce students to the exciting and curious world of the sea and shore. At the other end of the series, materials for sixth graders stress man's interactions with the marine environment. While the subject matter at each grade level is unique, as a whole the grade level guides will yield a broad understanding of the marine environment and its importance to Alaskans.

The purpose of this curriculum series is to help the teacher in interpreting the marine environment for elementary school students. However, what is included here is just a place to begin. As you read the following materials, you will find factual information about many aspects of the marine environment, and suggestions for presenting these concepts to students through multi-disciplinary activities both in the classroom and at field sites. Materials are organized into units, each covering a single idea or subject. From these you, the teacher, may select the units and activities which are best suited to your class, community and resources.

"Sea Week" originated in Juneau, and these curriculum materials are most applicable to southeast and southcentral Alaska. However, the Alaska Sea Grant Program has funded a three year pilot project to expand Juneau's successful program statewide. As Sea Week is piloted in 14 communities around the state, the Curriculum Series will be expanded to meet the needs of western, interior, and northern Alaska.

Send us your comments and suggestions. The strength of the final edition will depend not only on those of us staffing the project - but on you - your ideas and comments. After you've tried some of these activities - fill out and send in the evaluation sheet at the back of this book. Thanks so much!

Jill Thayer/Belle Mickelson, Coordinators
Mary Lou King/Nancy Barr, Consultants
Alaska Sea Grant Program
University of Alaska, Fairbanks, AK 99701
479-7631/7086

# INTRODUCTION

Alaska has more than 33,000 miles of shoreline; the earth's circumference is only about 25,000 miles. Much of Alaska's complex and intricate shoreline is accounted for by the bays, inlets, headlands, and islands of Southeast Alaska. Here in Alaskan communities large and small we live in close contact with the marine world. Some of us make our livings by fishing or working for the Coast Guard, the State's marine transportation system, or marine shipping companies. Most of us spend at least some of our time sport fishing, digging clams, beachcombing, or just gazing out at the incredible scenery of snowcapped mountains and everchanging inland waters.

The dynamic marine environment of which we are a part is our heritage, our trust. It is only fitting that our children know that world intimately so that they can grow up in an understanding of its complexities, it subtleties, & its importance. This is of particular urgency now that Alaska is facing increasing pressures to make decisions that will effect the use of her lands and seas for generations to come. We, and our children, must have a part in the decision making processes and the more knowledgeable we are, the more effective our participation will be.

Teaching children about the world in which they live is important and perhaps it has never been more important than it is in Alaska today. Teaching facts and concepts about the marine world is important but perhaps most important of all is the teaching of attitudes. It is hoped that through the study of marine life, students may gain the following:

1. An increased interest in their environment.

2. A greater awareness, appreciation, respect for the natural world that is so close about them here in Alaska.

3. The sheer delight, pleasure, happiness that can come from observing and understanding nature close up.

4. A sensitivity to the relationship between themselves and their environment.

If that can be accomplished, all our lives will be better because of it....

## INTRODUCTION - SIXTH GRADE

If the marine studies curriculum of which these materials are a part has been used in your school, your sixth grade students should already have an understanding of many aspects of the marine environment. They should already be familiar with many of the plants and animals that inhabit the intertidal zone and understand something about their complex relationships. They should recognize differences in intertidal habitats (rocky shores, mud flats, wetlands, etc.) and know something about the different kinds of life one might expect to find in each kind of area. They should also know about some of the fish living in Alaskan water, about the commercial fishing industry supported by some of these fish, and about aquaculture as it is practiced in Alaska.

In this curriculum series, the ideas introduced at sixth grade are a capstone. With a solid understanding of what the marine environment is, students are ready to consider the importance of that environment to people and to consider the impact of people on that environment.

The following materials should be used in the best way to fit the particular needs of a class or group of students. The materials have been developed around the many ways in which people and nature are interrelated in the marine environment.

General considerations are handled through classroom activities such as films, stories, interviews, presentations by resource people, role playing, class hearings, student writing, and discussions. Specific local studies involve field work as well as in-class preparation and evaluation.

If your students are not familiar with the Sea Week Curriculum, feel free to use materials from the other grade levels to prepare them for this unit.

## OBJECTIVES

To acquire a respect for and an appreciation of the natural values in a marine environment.

To recognize people's needs in the marine environment and the effect people have upon the marine environment.

To understand the planning for a quality marine environment is a process in which everyone can be involved.

# PEOPLE AND THE MARINE ENVIRONMENT

## Unit 1. WHAT IS THE MARINE ENVIRONMENT?

### Objectives

- To give students an opportunity to express their own concepts of the marine environment.
- To review what they have already learned about the marine environment.

### ACTIVITY 1 - DESIGNING A SYMBOL

#### Objectives

- To think about the marine environment and to derive a symbol that would represent it.

#### Teacher Background

Without giving the students any suggestions about what a marine environment might include, let class members express their own ideas as the unit begins. At the conclusion of the study, the same activities can be repeated or re-examined so that students can see if and how what they have learned has expanded their understanding of the marine world.

Materials:
- paper
- pencil
- various art materials

Procedure:

Give students the assignment of designing (individually, as a group or groups) a symbol to represent the idea of the marine environment. This process may involve student discussions or collaboration but should be largely without teacher direction.

The symbols could be used in any of the following ways so they will be visible during the study unit:

- as decoration on notebooks kept during the unit
- consolidated into a class collage
- used to construct a class mobile
- executed in batik, silkscreen, or as a block print

ACTIVITY 2

Objective

- To express in writing each student's understanding of the marine environment.

Teacher Background

In addition to expressing the concept of the marine environment as a symbol - or as an alternative to that activity, students might be asked or assigned to express either in prose or poetry their individual ideas of what the marine environment is. Each individual could then reassess his written definition at the end of the period of study. Student writings could serve as a basis for class discussion early, periodically, or summarily in the study period.

ACTIVITY 3 - REVIEW OF WHAT HAS BEEN STUDIED IN PREVIOUS YEARS

Objective

- To review or summarize the ideas about the marine environment that have been a part of the curriculum at lower grade levels.

Teacher Background

The review has several purposes. First is to help the students who have studied marine environment before, by bringing back to mind ideas or facts the students may have forgotten. The second is to be used as a capsule unit of new materials for students who have not built up such a background. Much of what students have already learned, both general concepts and specific facts, will become important to them as their sixth grade study progresses,

Materials:
- worksheets
- appropriate films
- appropriate slide tapes

Procedure:

Because these materials are intended as a review of what students have already learned, they should be presented with a teacher introduction but without content instruction. After students have completed the worksheets, class discussion and self-evaluation of individual work should follow.

Consult your school librarian or teachers of lower grades in deciding what available films would best summarize the marine environment or act as a catalyst for discussion or review.

## Unit 2. VALUES OF THE MARINE ENVIRONMENT

### Objectives

- To understand the marine environment does include a wide range of uses and there are many value systems involved in these uses.

### Teacher Background

Stress with students the idea everything they have learned in previous years about the marine world fits together as part of a total picture. Introduce the idea that the class will be studying how the total environment affects man and how man affects it. The concern will be with values - with what is important to people, to their survival, their quality of life, their aesthetic and economic well-being.

### ACTIVITY 1 - THINKING ABOUT PERSONAL VALUES

### Objectives

- To start each individual student thinking about what is important to him or her in the marine environment and to explore those values.

- five pictures depiciting marine environments - Magazines or calendars should be a good source of pictures. Pictures should be all black and white or all colors. They should vary from each other in the type of marine environment they depict. They might include:
  - a highly developed urban area along a waterfront
  - a wilderness area adjacent to the coast
  - recreational beach
  - shoreside industry

### Procedure:

Display the pictures on the wall or bulletin board. Ask each student to select the area in which he or she would most like to spend a specified number of hours or days. Students might be asked to use paper and pencil to individually list the pictures in ranking order of preference, number one being the most desirable environment in which to spend time.

When this is completed, ask students to write down their reasons for selecting a particular picture as most appealing.

After this has been done, involve students in a class discussion about their selections and the reasons behind them. Follow this up by taking one picture at a time and making a class list of all the reasons students have offered or can offer for preferring each of the scenes. Compare the values students have applied in making their choices. Are the values similar, different?

Upon completion of the above parts of the activity, assign each student to write the description of an imaginary day spent in the environment most appealing to them.

On a succeeding day, divide the students into committees to develop a plan for modifying one of the environments that was not their first choice. When this has been done, have each group, or a spokesperson for the group, present the plan for modification to the class. Students who have identified environment as a first choice should then be asked if they are willing to accept the modifications that have been recommended.

ACTIVITY 2 - THE MEANING OF COASTAL ZONE MANAGEMENT

Objectives

- To introduce students to the immediate importance of coastal management in Alaska.

Materials:

- Video film, "Choices for the Coast"
  Produced for the Coastal Zone Management Program
- questionnaire from tabloid, Choices for the Coast
- Coastal Zone Management survey summary analysis

Procedure:

View the video film, Choices for the Coast, with your class. After the film has been shown, distribute the related questionnaire and allow students time to fill it out. Tabulate and discuss the class responses to the questionnaire.

Compare the class response with the all-Alaska survey results. How did the class response differ, if it did. If it differs, discuss with students what they think might be the reasons for the difference.

Develop a class list of values of the marine environment that should be protected.

## Activity 3 - Coastal Oil Exploration

Objective

-To think about the need for and impact of coastal oil development.

Materials:

-film - Kachemak Bay (deals with the conflict of Outer Continental Shelf oil exploration and fishing interests in Kachemak Bay) available from state library

-film - Uncertain Summer (The people of Yakutat prepare for the oil industry) available from state library

(If neither film can be secured, substitute whatever other material-written or on film that you can find for a basis to discussion.)

Procedure.

View the film and follow it with discussion of the ideas and problems with which the films deal. What are the human needs involved?, What are the sources of conflict?, Can they be resolved?, What values should be the over-riding ones - or should any be?

## Activity 4 - Subsistence values

Objectives

-To understand what subsistence means, who it affects, and how subsistence values are being considered in fish and game management.

Teacher Background

In Alaska native Americans and many non-natives lived and live off the land. Recently the importance of this has been officially recognized by the establishment of a Subsistence Section within the Alaska Department of Fish and Game. The Section, which has been in existence since October, 1978, is based on a statute that establishes subsistence as the highest priority consumptive use of fish and game.

Materials:

-film - People of the Yukon Delta (a statement of the changing times, values of the old ways, and pressures of the new) available from the state library

-film - The Edge of the Barrens, a National Film Board of Canada production. (Thirteen minutes of beautiful photography about the balance of nature and the harsh limits upon the arctic caribou herd.) available from the state film library

-articles from newspapers, Alaska magazine on subsistence

-"What Happens Next?" A Conference on Subsistence
available from S.E.R.R.C.

Procedure.

View films with the class and discuss the ideas they express.

Follow-up, by asking students to find and read articles that describe subsistence living in Alaska. Have students share what they have read with the class, perhaps reading particularly descriptive sections.

Discuss, or find information, specifically related to the importance of the sea in subsistence.

Listen to tape on subsistence by Walter Williams.

Additional activities related to subsistence values

1. Involve students in researching and learning about the wild foods available in or near their community.

2. With student involvement, prepare a meal off the land.

3. Invite a native Alaskan into the classroom to talk about the old ways of living off the land.

4. Assign someone to find out about the work of the Alaska Department of Fish and Game subsistence section or, if there is someone from the section in your community, invite him or her to speak to the class.

## ACTIVITY 5 - JOBS RELATED TO THE MARINE ENVIRONMENT

Objective

-To recognize that the marine environment means a source of employment to many people.
-To learn about some of the jobs that are marine related.

Materials:
-Telephone books (optional)

Procedure.

In order to begin to see how many jobs in Alaska ar[illegible] marine related, make a class list of jobs that are marin[illegible] related. The list may be general or may be limited to your own community. It may be pulled from the students heads or you may use the yellow pages of the phone book as

a starting point. You may want to make two lists - one of jobs that are directly related to the sea (fisherman, ferry crews) and a second list of support jobs (sporting goods store people, fuel suppliers, etc.)

Additional activities related to jobs:

1. Assign students to interview a person in a marine related job. Prepare them for this task by working in groups - or individually - to develop the questions that might be asked. In class, go over the procedure for an interview - or decide on one as a group! After the interview, the student or students involved should make an oral report to the class about what they learned.

2. Show the Alaska Department of Fish and Game slide-tape show. Film shows the work of members of the department, including jobs in the marine environment.

## ACTIVITY 6 - RECREATIONAL OPPORTUNITIES PROVIDED BY THE MARINE ENVIRONMENT

Objective

-To recognize the importance of the marine environment in the area of recreation.

Materials:
-none

Procedure.

As a class develop a list of types of recreation related to the marine environment. You might begin with a general list, then mark or rank the activities especially important in your local area.

Ask or assign students to research and write about one sport, hobby, or recreational activity that is tied to water. The following are some aspects that might be included:

- history of the sport
- equipment used
- cost of participating
- pleasures derived
- hazards
- personal statement of why it does or does not appeal to the person writing the report

As an alternative or supplement, students might be asked to write an imaginative description - or poem - in which they pretend to be participants in a marine sport.

What kinds of seasonal, area, and quantity restrictions are imposed on the various commercial fisheries?
What about the taking of marine mammals? How is that regulated? Who controls regulation?

The concept of limited entry continues to be a controversial one. Current newspapers and periodicals may carry materials related to it. Consider asking interested students to research the issue and make a report to the class.

Additional Activity

1. If you live in a fishing community, consider asking a fisherman or a member of ADF&G to come in to the class and discuss regulations with the class members. Perhaps you could ask a fisherman to outline what he does during the season, where he fishes and when in order to comply with regulations.

B. Alaska Coastal Management Plan

Materials

Many printed materials are available on the coastal management plan. (If you cannot secure any locally, write to Office of Coastal Zone Management, Pouch AP, Juneau, Alaska 99811)

Method

Assess the materials you have available and decide how best to use them - as background information for yourself, as general class reading, or as material for individual assigned reading or reporting.

Be sure that in one way or another the following ideas are covered:

- Why is there a need for a coastal plan? What is the effect of increased population upon the coast? What is the effect of modern technology on the coast (include oil, logging, transportation, etc.)?
- What mechanism has been set up to establish a plan for Alaska's coast? What agency is in charge? How are local citizens being involved in the process?

C. Environmental Impact Statements

Teacher Notes -

The National Environmental Policy Act became law on January 1, 1970. Section 102 of the law requires that all federal agencies prepare a "detailed statement on every recommendation or report on proposals or legislation and other federal actions significantly affecting the quality of the human environment." An environmental impact statement is required for all projects directly undertaken by federal agencies; supported in whole or part by federal agencies, contracts, grants, subsidies, loans, or other forms of assistance; or requiring a federal lease, permit, license or certificate if the effect is deemed significant.

## Unit 3 - PLANNING FOR WISE USE OF THE MARINE ENVIRONMENT

Objectives

- To learn about the present law that regulate activities in the marine environment.
- To learn about how coastal policies and laws are made and enforced.
- To think through the process of coastal management.

### ACTIVITY 1 CONTROLS AND REGULATIONS AFFECTING ACTIVITIES RELATED TO THE MARINE ENVIRONMENT

Objectives

- to recognize like all other aspects of our lives, those related to the marine environment that come under certain man-imposed restrictions.
- to learn what kind of restrictions exist concerning Alaskan marine waters.
- to think about these restrictions, their reasons and their value.

A. Fish regulations

Materials:
- copy of ADF&G sport fishing regulations
- copy of ADF&G commercial fishing regulations
- information on limited entry

Procedure:

Depending on the availability of written and human resources, work with the whole class or assign individual students the task of reviewing parts of the regulations or researching the idea of regulation. Try to find answers to some or all of the following -

How are regulations established?
How are they enforced?
What are the sport fishing limits for the salmon species? For other fish and shellfish? What are the seasonal limits? The geographic limits?
What does handtrolling involve? What are the restrictions on it?
Why was limited entry established for commercial fishing?
What fisheries does it affect? What does it mean? What is the cost of permits?

A draft statement must be prepared at least 90 day before the proposed action occurs. The draft EIS is reviewed by federal, state and local agencies and is available to the general public. Questions and comments arising from the review of the statement must be answered and made public at least 30 days prior to initiating the proposed action. Review agencies or members of the public considering the prepared statement inadequate may file a court suit requiring further research into the project's environmental impact. Regular court proceedings then determine the adequacy of the statement. If the EIS is declared inadequate, it may be revised and submitted again. If the statement is found to be adequate, the proposed action may proceed. If the environmental impact is predicted to be seriously detrimental, further litigation may occur delaying or prohibiting the proposed action.

An environmental statement is not a justification for funding or action. It is required to ensure that environmental qualities, technical and economic factors and concerns of the public are all fairly considered.

Materials

Check with the planning department in your community to see if you can borrow or have a copy of an Environmental Impact Statement that has been developed for some project in your community.

Method

Working from the background information given above and the materials you require, discuss the idea of environmental impact statements with the class. Then consider some of the following:

- What projects in your area would require and environmental impact statement? (They might be real or imaginary)
- What projects are or could be completed in your local community WITHOUT an environmental impact statement?
- Why are environmental impact statements more important now than they were 10, 50, 100 years ago?
- What things in our nation, state, or community might be different had environmental impact statements been required?

Additional Activities

1. View the movie, <u>At the Crossroad</u> (the struggle for survival of endangered species) or the video film <u>Choices for the Coast</u> - if you have not already used the latter.

Activity 2 - Alaska Coastal Management Land Use Simulation Game

Objective

To involve students in a simulation of the process of coastal management.

Teacher Notes -

The following activity was developed by US Forest Service personnel. You may want to continue this activity over the period of a week or even longer. You will find that it breaks easily into sections which can fit into sequential blocks of time. Carrying out the activity as outlined below will involve students in a simulated, but "real" process and will make more vivid to them the complex problems of coastal management. It will also require them to think carefully about their own individual values and to consider those held by others.

Materials

A lesson plan for An Alaskan Coastal Management Land Use Simulation Game.

Method

The simulation game package been kept as a separate unit. Please adapt it as needed (you may want to extend or omit time limits, etc.) to your particular class and students.

A Lesson Plan For

# An Alaskan Coastal Management Land Use Simulation Game

Set the stage for this investigation by reviewing what will take place. For example, "During the next four hours, we will participate in a simulation game concerning land use in a hypothetical coastal Alaskan community. You will assume the role of decision-makers in a simulated environment and compete for certain objectives according to specified procedures and rules. We will then analyze the land management decisionmaking process."

## I. AN INTRODUCTION TO COASTAL MANAGEMENT IN ALASKA

1. Distribute the "Alaska Coastal Management Background Information" sheet (page 8). Ask the group to read the background information. If necessary, discuss it to give people a basic understanding of CM in the State.

## II. NAMING, RECORDING, AND CLASSIFYING POSSIBLE USE OF LAND

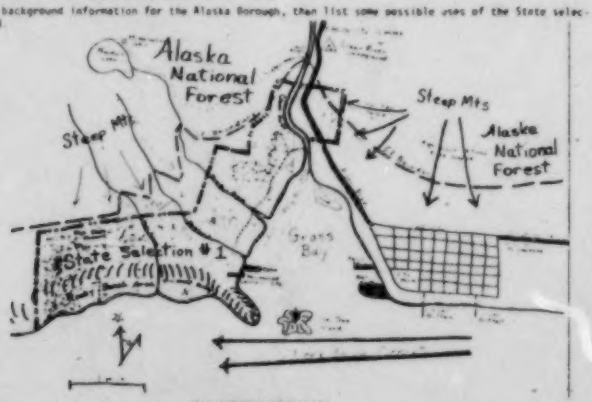
1. Distribute Task A. Read the problem to the group and then have them read the given information on Task A and list the possible uses of the land to meet the borough's needs.

2. "The problem is to identify some possible uses for the 6 square mile tract of land in the coastal zone of the Alaska Borough."

TASK A

The Federal Government has conveyed to the State a six square mile tract of land in the coastal zone of the Alaska Borough. This land may remain in State ownership, may be selected by the Borough, or portions may pass into private ownership by way of a land sale.

Read the background information for the Alaska Borough, then list some possible uses of the State selection land.




BACKGROUND INFORMATION

1. The selected land and Coast City are in the coastal zone and surrounded by National Forest land.
2. There is a shortage of available land due to federal land ownership, terrain, and natural hazards.
3. Coast City's population is 2,500 and increasing, creating a demand for housing, jobs, additional services and recreation areas.
4. Forty percent of Coast City's population depends primarily on fishing for their livelihood.
5. Twenty-five percent of the population is unemployed during the winter.
6. Energy supply is adequate for Coast City's increasing development.
7. The Clean River is a salmon stream, is navigable for power boats, but not skins; and has a productive estuary. The Clean River also supplies adequate water for Coast City.
8. Citizens of Coast City are interested in maintaining a scenic regional environment.
9. The abandoned cannery qualifies as a historic site but has not been classified as one.
10. Raw sewage enters the ocean through outfalls, and solid waste disposal is an increasing problem.
11. Sand and gravel are available from the Clean River and Grass Bay, but presently they are not being commercially removed.
12. Prior Forest Service management of the selected land was as roadless backcountry with emphasis on wildlife habitat and recreation. Adjacent National Forest land will continue to be similarly managed.
13. The nearest airport is 10 miles away in North City.
14. The Clean River estuary is part of a migratory flyway for a number of species of ducks and geese.
15. The Alaska Borough is an organized borough. Recently the area on the map called "State Selection #1" was conveyed to the State. The rest of the borough Coastal Management plan is complete. Because of this new transmittal, the borough is now planning the management of State Selection Area #1.

List possible uses of the land

USDA Forest Service
Juneau, Alaska

*Questions and Discussion*

*When most people have started to write down uses on Task A, go ahead with question 1.*

1. *"What are some possible uses for the undeveloped land?" As people respond, write all comments just as they are said. Instead of paraphrasing if they are too wordy, ask: "How shall I write that on the chart?" List all suggestions, specific or general. Number the items as you go along, to simplify identification later. When you feel that you have enough material, go on to question 2.*
2. *"Which of these possible uses are similar?" Designate similar uses by letter, symbols, or colors. When most are designated, or the group seems to run out of thoughts, stop. Change items among categories if the participants think one use should be in another category, then put that use in both cateogries and go on to the next step.*
3. *"What label could we give to all the items in the same category?" (Recreation, industrial, utilities, housing, commercial, and so forth.)*

III. ANALYZING LAND USES

1. Divide the group into the number of land use categories identified, with not more than eight persons per section. Assign one of the categories to each group for them to represent. One way to set up groups is to have the total group count off by the number of categories identified.

2. Pass out Task A-1. Inform the participants "You have 10 minutes to list the land uses within your assigned category according to the basic State of Alaska Coastal Guidelines and Standards concerning coastal development. You may consider those listed on the board plus any other possible uses you can think of in your category."

Task A-1 (in groups)
Group_____
Assigned category_____

Within your assigned use category, list the land uses according to the basic State of Alaska Coastal Guidelines and Standards.

1. Water-dependent uses and activities

(water-dependent means a use or activity which can be carried out only on, in, or adjacent to water areas because the use requires access to the water body.)

2. Water-related uses and activities

(water-related means a use or activity which is not directly dependent upon access to a water body, but which provides goods or services that are directly associated with water-dependence and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered.)

3. Uses and activities which are neither water-related nor water-dependent for which there is no feasible and prudent inland alternative to meet the public need for the use or activity.

| water-dependent | water-related | neither |
|---|---|---|
| marina | restaurant with marine view | theater |

* In planning for and approving development in coastal areas, local governments and state agencies shall give highest priority to #1 above, second priority to #2 above, and third priority to #3 above.

2

3. "Next you are to list and analyze the positive and negative impacts of each use in your category to the resources and the people. You have about 10 minutes."

Task A-2 (in groups)

Group_____ Assigned Category of resource use_____

Your only task is to list and analyze the positive and negative impacts of each use in your category to the resources and the people, given the site constraints.

| Use | Positive Impacts | Negative Impacts |
|---|---|---|

IV. DEVELOPING AND PRESENTING PROPOSALS

1. "Your next task is to develop a proposal within your assigned use category, for the use of any part of this 6-square mile tract of land. The object of this is not to propose use for the entire 6-mile tract, but to propose two or three uses to be implemented on sites within the state selection land."

   If all directions are given at first, many groups start drawing a map before considering different land uses.

2a. "We have just received word that the borough planning commission members have resigned. Each group has one minute to elect one member to represent them on the Planning Commission.

b. One of the facilitators takes the new Commission members to another room and:

   Passes out Task B and reviews it with them.
   Tells them they have 15 minutes until the group meeting starts.
   Has them develop evaluation criteria first.
   Tells the Commission to elect a chairperson to preside during the group presentation.
   Instructs the chairperson to read over the announcements, Task B, Part 2 to the whole group.
   Decides which staff person will be the timekeeper.

Task B (Planning Commission)

"The Federal Government has conveyed to the State a six square mile tract of land in the coastal zone of the Alaska Borough. This land could remain in State ownership, could be selected by the borough or portions could pass into private ownership by way of a land sale."

1. Using the information provided, your task is to:

   a. Develop criteria to evaluate each proposal
   b. Develop a system to record your evaluations

2. Select a chairperson to preside over the presentation of proposals. The chairperson will make the following announcements:

   a. Because of time constraints, there will be no rebuttal after presentations.
   b. The Commission may ask two or three clarifying questions of each group after all the presentation.
   c. You have 3 minutes to give your presentation. You will be given a warning when you have 1 minute left.

| Group Making Presentation (use category) | Criteria to Evaluate Proposal (Rating) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

3. After the Planning Commission leaves the room, make this announcement:

   "You have about 15 minutes to finish your plan and develop a 3-minute presentation to be made to the Planning Commission. Your 3-minute presentation must include a visual display, such as a land use map, and more than one person in each group must participate in making the presentation." Pass out markers and large map or sheet of paper.

4. When all groups are ready, have the Planning Commission enter the room and sit at the front. The chairperson makes the announcements from Task B and sticks to them, in order to keep the process moving. The timekeeper is to stop all presentations at 3-minutes and give 1-minute warnings.

5. When the presentations are finished, the Planning Commission retires for 20 minutes to select the best proposal, or to combine several proposals to develop the best.

6. "While the Planning Commission is meeting, each group is to develop a list of criteria that they think should be used in evaluating the plans submitted."

7. The Planning Commission re-enters the room, announces their decision, and reads criteria used in making the decision. Planning Commission adjourns.

   Person in charge must move rapidly to the next question to avoid shouting matches between losing groups. Have Planning Commission members return to the groups who selected them. The main purpose is to evaluate the process, not to get bogged down in the content of the issue.

8. Regroup participants. Each new small group will consider some ways to reduce the impact for one of the proposed uses. For instance, if the Planning Commission determined the land should be used for a state park, a nuclear power plant, a cannery and an apartment complex, regroup participants in four groups, one group to consider each use.

Task C

The Planning Commission has selected a proposed use for this piece of land. Working in small groups you are to list some possible ways to reduce the impact where changes are proposed. Some things you might consider are: access, parks, landscape, beautification, setbacks, pollution abatement, and the impact on resources.

Your assigned use:_____

Some possible ways to reduce impact:

*Questions and Discussion*

1. *"How does your group propose to reduce impact where changes are proposed?"*

2. *"What additional data would you have liked to have for planning your group's proposal for the use of land?"*

   *As examples, list on board: Toporgraphy, vegetation, economy of area, shopping center, adjacent land, climate, soil survey, historical information, flood plain, wildlife, interest of board of control, money available, educational needs, regulations by State, existing zoning, political climate, population information (age, needs, race, jobs).*

3. *"Where would you go to collect information on these topics?"*

4. *Point out to the group that this is one of the most important parts of the activity because it emphasizes that we need a variety of information and data before we can intelligently make a land management or environmental decision to best meet the needs of people and their environmental issue or concern. It also includes elements that need to be considered in studying a local environmental issue or concern. It also includes elements of all the curriculum subject areas (social studies, sciences, language, arts, etc.) We have to use, therefore, the total community as a classroom or learning environment to collect the information.*

5. *Discuss any case histories of teachers or groups using this approach.*

V. ANALYZING CHARACTERISTICS OF SIMULATIONS

(Have on chart) "One group of people working with simulation games has identified at least three basic characteristics of most simulation games:

1. "There is a clearly defined problem."
2. "There are factors that influence the decision."
3. "There are individuals and groups interested in the decision."

VI. DEVELOPING YOUR OWN SIMULATION GAME

*Questions and Discussion*

1. *"The most exciting simulation games are the ones people develop themselves, on the basis of local environmental issues in their community, state or region."*
2. *"Can you think of some current environmental issues in your own community around which you could develop a game?" Call for responses.*

VII. SUMMARY

*Questions and Answers*

1. *"How can you use the techniques in this session in your job situation?"*
2. *"How could a game like this develop decisionmaking skills in environmental management?"*
3. *"How can we take this process and use it to involve the public in social and political decisionmaking action projects in the community?"*
4. *"How can we summarize the use of simulation games in environmental interactions?"*
5. *"Simulation games can help people to understand problems in the environment and develop awareness and concern about these problems and develop the skills needed for citizen action and involvement in environmental management."*
6. *You may want the participants to evaluate the session by writing how they felt about it.*

VIII. SOME OBJECTIVES

Behavioral Outcomes in Knowledge

A. As a result of this session, each participant should be able to:

1. Identify and describe three component parts of simulation games.
2. Name and describe at least 10 important types of data needed before making a land management decision.
3. Identify cause and effect relationships that exist in environmental management.
4. Describe alternative solutions to solving a specific problem.

Behavioral Outcomes in Feelings, Awareness, Values, and Action

A. As a result of this session, each participant should be able to:

1. Describe how the information in Part V could affect their life, community, and the management of the environment.
2. Outline a plan of action to develop their own land use simulation model.

IX. EQUIPMENT NEEDED

Blackboard, chalk or easel, and markers
Newsprint or butcher paper (enough for each group to make visual display)
Markers (four colors for each group to make visual display
Masking tape

IX. EQUIPMENT NEEDED (Continued)

Task Cards
Commercial games on display (optional)

X. ACKNOWLEDGEMENTS

This simulation game was written according to the format of the of the Centerplace City Land Use Simulation Game. People who developed it were Mary Lou King, Juneau; Gordy Euler, Ellen Searby and Judith Anderegg, Alaska Coastal Management Office; David Dall, Joe Firebaugh, Neil Hagadorn, Kristi Kantola, Elaine Loopstra, and Paul McIntosh, Forest Service, Alaska Region.

The tasks and discussion topics in this lesson are designed so that many can be done individually or in combination, depending upon the facilitators' objectives and time constraints.

It is suggested by the writers that continual plan revision be done by the people who use this plan.

## ALASKA COASTAL MANAGEMENT BACKGROUND INFORMATION

### DEFINITION

COASTAL ZONE - "the coastal waters (including the lands therein and thereunder) and the adjacent shorelines (including waters therein and thereunder), strongly influenced by each other... it includes transitional and intertidal areas, salt marshes, wetlands, and beaches." (From the National CZM Act.)

Initial coastal zone boundaries for the Alaska Coastal Management Program (ACMP), before Council approval of district programs are based on the Biophysical Boundaries of Alaska's Coastal Zone, published by the Office of Coastal Management and the Alaska Department of Fish and Game.

### THE NATIONAL CZM ACT

The National Coastal Zone Management Act of 1972 established a program for the management of the land and water resources of the Nation's coastal zone. The act provides states who wish to participate with funds to develop programs to plan for and manage their coastal areas. Each state develops its own coastal management plan subject to approval of the Federal Office of Coastal Zone Management on behalf of the Secretary of Commerce.

### APRIL, 1979, UPDATE ON ALASKA COASTAL MANAGEMENT PROGRAM
(Provided by the Alaska Office of Coastal Management, Division of Policy Development and Planning.)

At the present time, the ACMP is being reviewed by the Federal Office of Coastal Management for their approval. When the ACMP receives Federal approval, Federal agencies will have to be consistent with state programs, and the ACMP will be eligible for additional funding to implement the program. The basis for the ACMP is the 1977 Alaska Coastal Management Act which established the Alaska Coastal Policy Council to oversee the statewide and local coastal planning efforts. The Coastal Policy Council was mandated to draft a set of guidelines and standards which would be used by state agencies and by local communities in their respective coastal planning and management efforts.

Communities and boroughs with planning and zoning authority are required to write local coastal plans. They have 30 months from the signing of the legislation (until December 1979) to have made substantial progress towards the completion of coastal programs.

A large portion of the State lies in what is commonly referred to as the unorganized borough. It has no local planning and zoning authority. The State is responsible for its management.

In the Act, there is a process outlined to allow sections of the unorganized borough to write their own local coastal plans if they so desire or if they are required to because of pending economic development. (There are very few people in the unorganized borough). At the present the Council is studying the issue of coastal planning in the unorganized borough.

Plans written by communities and sections of the unorganized borough will be submitted to the Alaska Coastal Policy Council for their approval. Once a local plan is adopted by the Council and approved by the Legislature, it becomes a part of the ACMP, and State and Federal agencies should be consistent with it. (Assuming Federal approval of the ACMP.) Where local coastal plans are not in effect, appropriate State agencies use the guidelines and standards to manage the Coastal areas accordingly.

### THE DECISION - MAKING PROCESS

Guidelines & Standards ▶ Coastal Resource Districts and State Agencies ▶ Alaska Coastal Policy Council ▶ State Legislature

The guidelines and standards approved by the Legislature are the regulations now used by the State in managing the Coast.

A coastal resource district develops a local plan using the guidelines and standards. Coastal resource districts are first and second class boroughs, home rule and first class cities, and second class cities which practice planning and zoning. Sections of an unorganized borough can also form a coastal resource districts. (See the Alaska Coastal Management Act.)

State agencies carry out their management responsibilities consistent with the guidelines and standards, and will assist districts in writing their plans.

The coastal resource district submits its plan to the Alaska Coastal Policy Council, for its review and approval.

The Alaska Coastal Policy Council submits the plan to the State Legislature for approval.

When the plan is approved by the Alaska Coastal Policy Council and the Legislature, the plan takes effect in the coastal resource district. Federal and State activities within the district are then to be consistent with the plan. (Federal consistency is contingent upon Federal approval of the ACMP.)

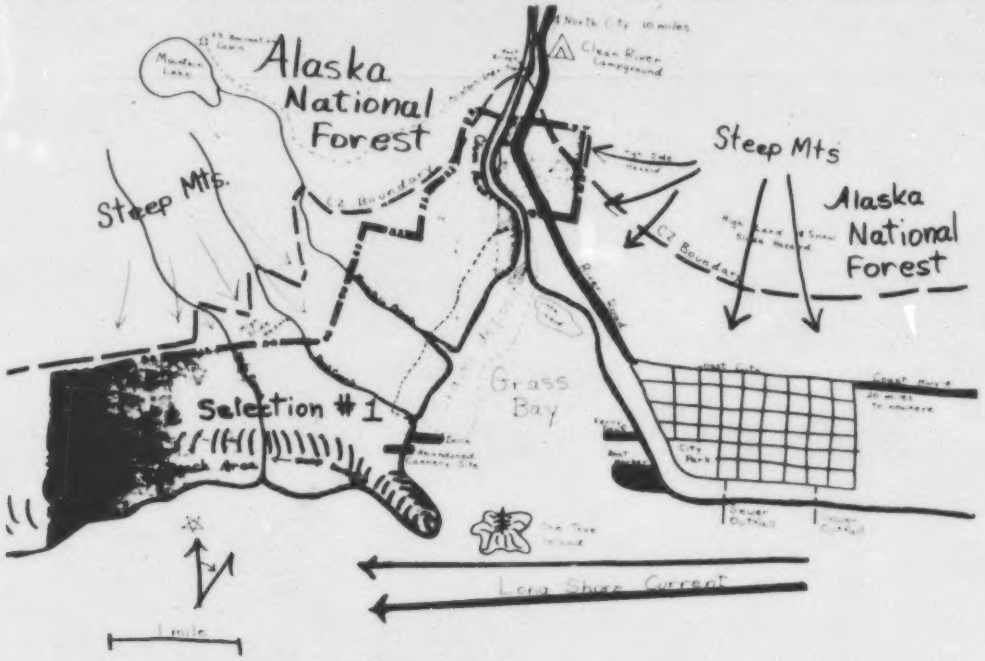
This update will be current for only 2 or 3 months. For a current update, or if you have further inquiries call the Office of Coastal Management in Juneau (465-3540).

8

TASK A

The Federal Government has conveyed to the State a six square mile tract of land in the coastal zone of the Alaska Borough. This land may remain in State ownership, may be selected by the Borough, or portions may pass into private ownership by way of a land sale.

Read the background information for the Alaska Borough, then list some possible uses of the State selection land.




BACKGROUND INFORMATION

1. The selected land and Coast City are in the coastal zone and surrounded by National Forest land.
2. There is a shortage of available land due to Federal land ownership, terrain, and natural hazards.
3. Coast City's population is 2,500 and increasing, creating a demand for housing, jobs, additional services and recreation areas.
4. Forty percent of Coast City's population depends primarily on fishing for their livelihood. Twenty-five percent of the population is unemployed during the winter.
5. Energy supply is adequate for Coast City's increasing development.
6. The Clean River is a salmon stream; is navigable for power boats, but not shins; and has a productive estuary. The Clean River also supplies adequate water for Coast City.
7. Citizens of Coast City are interested in maintaining a scenic regional environment.
8. The abandoned cannery qualifies as a historic site but has not been classified as one.
9. Raw sewage enters the ocean through outfalls, and solid waste disposal is an increasing problem.
10. Sand and gravel are available from the Clean River and Grass Bay, but presently they are not being commercially removed.
11. Prior Forest Service management of the selected land was as roadless backcountry with emphasis on wildlife habitat and recreation. Adjacent National Forest land will continue to be similarly managed.
12. The nearest airport is 10 miles away in North City.
13. The Clean River estuary is part of a migratory flyway for a number of species of ducks and geese.
14. The Alaska Borough is an organized borough. Recently the area on the map marked "State Selection #1" was conveyed to the State. The rest of the borough Coastal Management plan is complete. Because of this new transmittal, the borough is now planning the management of State Selection Area #1.

List possible uses of the land

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Task A-1 (in groups)
Group_____
Assigned category_____

Within your assigned use category, list the land uses according to the basic State of Alaska Coastal Guidelines and Standards concerning coastal development.

1. Water-dependent uses and activities

(water-dependent means a use or activity which can be carried out only on, in, or adjacent to water areas because the use requires access to the water body.)

2. Water-related uses and activities

(water-related means a use or activity which is not directly dependent upon access to a water body, but which provides goods or services that are directly associated with water-dependence and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered.)

3. Uses and activities which are neither water-related nor water-dependent for which there is no feasible and prudent inland alternative to meet the public need for the use or activity.

| water-dependent | water-related | neither |
|---|---|---|
| marina | restaurant with marine view | theater |

* In planning for and approving development in coastal areas, local governments and state agencies shall give highest priority to #1 above, second priority to #2 above, and third priority to #3 above.

Task A-2 (in groups)

Group_____ Assigned Category of resource use_____

Your only task is to list and analyze the positive and negative impacts of each use in your category to the resources and the people, given the site constraints.

| Use | Positive Impacts | Negative Impacts |
|---|---|---|

Task B (Planning Commission)

"The Federal Government has conveyed to the State a six square mile tract of land in the coastal zone of the Alaska Borough. This land could remain in State ownership, could be selected by the borough or portions could pass into private ownership by way of a land sale."

1. Using the information provided, your task is to:

   a. Develop criteria to evaluate each proposal
   b. Develop a system to record your evaluations

2. Select a chairperson to preside over the presentation of proposals. The chairperson will make the following announcements:

   a. Because of time constraints, there will be no rebuttal after presentations.
   b. The Commission may ask two or three clarifying questions of each group after all the presentations.
   c. You have 3 minutes to give your presentation. You will be given a warning when you have 1 minute left.

| Group Making Presentation (use category) | Criteria to Evaluate Proposal (Rating) | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Task C

The Planning Commission has selected a proposed use for this piece of land. Working in small groups you are to list some possible ways to reduce the impact where changes are proposed. Some things you might consider are: access, parks, landscape, beautification, setbacks, pollution abatement, and the impact on resources.

Your assigned use:_____

Some possible ways to reduce impact:

## Unit 4 - STUDYING A LOCAL DEVELOPMENT SITE

Objective

- To think specifically about coastal development at a local level.

- To participate in assessing environmental change.

Teacher Notes

If students have developed an awareness of the complexity of coastal management through the activities that have been outlined up to this point, they are ready to tackle a real problem on the local level. Because most of our communities are changing and adjusting to growth, you will probably be able to identify a contemplated, marine-related development in your community. If possible, involve students in the selection of a study site.

### Activity 1 - Land Use Planning

Objectives

- To consider the selected study site and determine its best use

Method

After a contemplated development has been selected for study, visit the proposed site - or if it is already quite familar to everyone in the class, recall it mentally. Then, as you did in the simulation game:

1. Ask each student to write down a list of all the possible uses for the area. No limits to the imagination!

2. List the suggestions on the board.

3. Identify similar uses by labeling like uses with the same letter.

4. Name each group with a categorically descriptive word describing the use (industrial, recreational, commercial, tourism, residential, educational, etc.)

5. Ask each student to select one category of use for the area and to develop a proposal for the area to comply with that use. This may be done by individual students or may work best as a group activity.

Activity 3 - Visiting a marine industry

Objectives

- To become more aware of the marine related industries in your community.

- To evaluate the environmental conservation practices of these industries.

Materials

- student developed check-list (see below)

Method

If you wish to do so before going on one or more field trips, involve students in developing a checklist that the class can use for evaluating environmental conservation practices of the marine industries they will visit. Your checklist might look something like the following:

Possible factors:

Area is free of trash
Area is free of odors
Area is free of loud noises
Area is fee of raw sewage
Area is free of oil traces
Animal life is present
Plant life is present
Water appears clear.

The checklist might be kept in mind and could be by each student or by the class after the field trip has been completed.

The industry you visit will, of course, depend upon what your community includes. The following are possibilities:

- Seafood processor
- Cold storage plant
- Oil company dock
- Flying service
- Vessel terminal or dock
- Marina
- Sewage disposal plant

After the field trip and completion of the checklist, involve the class in a discussion of what could be done in their community in general to lessen detriment to the environment. What can the students as community members do to contribute?

When each student or student group has had enough time to prepare a proposal, conduct a public hearing before a student planning commission. Do this as follows:

1. Select 5 students to sit as the planning commission, and designate one student as chairman.

2. Arrange the classroom like an auditorium.

3. Call upon one student representing each kind of use (industrial, recreational, etc.) to present his or her group's plan to the commission.

4. After each presentation, the commission chairman should call for questions or comments from the audience. (Encourage student participation!)

5. After the presentation is completed, the commission should be allowed time to discuss the proposals and arrive at a decision for the use of the area. In doing this, they need to keep in mind the earlier expression of class values and be sure that their decision is in keeping with those values.

Activity 2 - History of the area

Objectives

- To learn about the history of the area where proposed development is to take place.

Teacher Notes

Learning about the history of the site in question may be best conducted at this point - or could be done before the land use planning activity.

Method

Involve students as individuals or as groups in discovering:

1. Uses of the site long ago and recently.

2. Ways in which the area has been altered naturally and by people.

If possible, invite a guest into the classroom to show pictures of the area in previous times or to talk about the history of the area. (This is a good activity in which to encourage students to learn of their community history and heritage by listening to their parents and grandparents or other older members of the community.)

Additional Activities -

1. Students might be asked to write a story with the site as the setting and the time a particular epoch in the past.

Activity 3 - Reviewing the development proposal

Objectives

- To learn about the development proposed for the area

Materials

Any of the following as available:
Environmental Impact Statement
Design study or architect's plans
Testimony from public hearings
Maps, models, charts

To obtain these, contact city or borough planning commissions, the local mayor or city council or other appropriate officials.

Method

Depending on the technical qualities of the materials you amass, discuss them as much as possible with students. You may want to assign particular documents or sections to individual students for summarizing to the class - or you may need to present the materials yourself in a digested form - or bring a resource person into the classroom to discuss the proposed development.

Activity 4 - Field study of the site

Two separate approaches to field study are described below. The first is the less complex of the two. The second is more extensive and lends itself to the making of comparisons between beach levels, between several sites, and between seasons and even years at the same site. You may wish to read the materials for both approaches to the field study and draw from them that which will work best with your class.

Field Study 1

Instructions for students: (at least a day before trip)

From Home:
Wear boots and warm outdoor clothes
Bring 1 pencil
Bring 1 wire coat hanger

At school:
Choose 1 partner to work with on the beach
Measure each student's stride length in inches and write it down (take five normal steps, measure number of inches and divide by five)

At the Beach:
Each team of partners will pace the designated beach to measure its size.
Each person will guess how many living animals and plants are on the measured beach.

Beach Plot Sampling Activity by: James G. and Mary Lou King

INSTRUCTIONS FOR BEACH PLOT SAMPLING SYSTEM
TO DETERMINE HOW MANY VISIBLE PLANTS AND ANIMALS
ARE PRESENT

The students will:

1. Pull wire coat hanger to make a square.
2. Drop hanger at low tide line.
*3. One person will count all visible plants and animals that can be seen within the coat hanger plat. The other person will write the numbers in the proper blocks on the recording sheet.
4. Toss the hanger inland ten or twenty feet and record this plot and so on to the upper edge of high tides.
5. Determine size of beach study area by pacing off its length and width and record on sheet.
6. Add all Recording Forms actoss to give totals.

The instructor will:

1. Collect all Recording Sheets.
2. Add all plat figures to get a total for all plots.
3. Determine the plot average in each category by dividing the total recorded numbers by the total number of plots recorded.
4. Determine an expansion factor to multiply the figures in (3) above to determine total number of creatures and plants for the entire selected beach.

$$\frac{\text{Total square inches on the beach}}{\text{Total square inches in (1) plot}} = \text{Total plots on entire beach}$$

Averages from (3) above X Total plats = Total creatures

*Do not move or turn rocks. Seaweed can be moved but not broken off.

## Field Study 2

### Objective

- To use field data as a means of monitoring change to the environment.

Teacher Notes -

Scientists are continually monitoring particular parts of our environment to assess the extent and kinds of changes that occur - both naturally and because of the activities of people. As part of your class study of a proposed change to the marine environment in your community, you have the opportunity to involve your students in "real science", to conduct an investigation exactly like that done by professionals concerned with the environment.

At your local level, such an investigation might well prove to be of interest to local planners. Thus you may want to consult with them about the kinds of study to propose for your class, find out if the data would be of interest to the planners, and find out if there are additional kinds (or other kinds) of data your class could gather that would be of "real" use.

In order to determine the effects development has upon a selected site, field observation data must be collected in the area before, during, and after completion of the project. Thus this is a long-term project that may involve students or classes over several years. Because of this, as many elements as possible should be standardized so that data is consistantly taken from year to year and can, therefore, be compared.

Tasks for Site Study

1. Location and marking of study plots

Materials -

stakes and markers
adhesive tape
100 foot length(s) of ¼inch rope
coat hangers

Method

Prepare the rope by marking it off at one-meter intervals with adhesive tape tags; number each consecutively. Prepare the coat-hangers by bending them into squares of the same size and proportions. (Alternatively you may want to prepare metal frames that will give you a standard area.)

At the area to be studied (time your trip to coincide with a low tide if you are interested in an intertidal area), select 1, 2, or 3 areas actoss which to stretch your rope. This will be a straight line and will be called a transect. If you are dealing with an intertidal area, the transect should be a line more or less perpendicular to the water and stretching from the water to the high tide zone (or beyond).

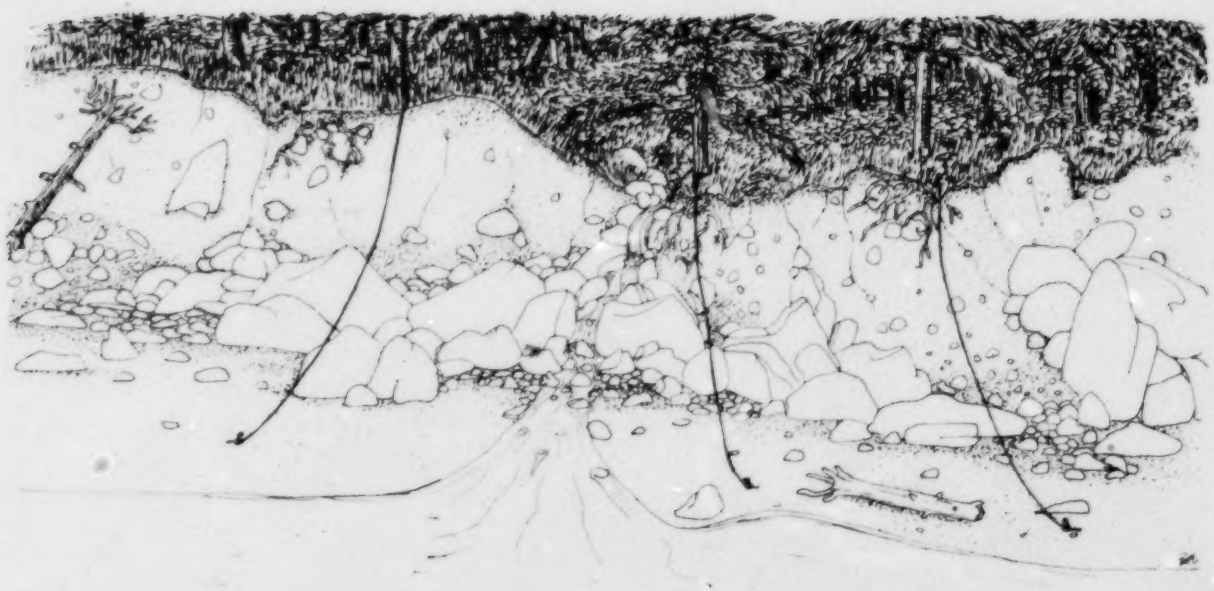
## BEACH PLOT SAMPLE RECORDING SHEET

Beach Dimensions: Length___ Width____

| Plot Numbers | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total | Aver-age | Beach Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANIMALS | | | | | | | | | | | | | | | |
| Sea Anemone | | | | | | | | | | | | | | | |
| Worms | | | | | | | | | | | | | | | |
| Starfish | | | | | | | | | | | | | | | |
| Sea Urchin | | | | | | | | | | | | | | | |
| (black) Sea Cucumber | | | | | | | | | | | | | | | |
| Chiton | | | | | | | | | | | | | | | |
| Blue Mussel | | | | | | | | | | | | | | | |
| Clam | | | | | | | | | | | | | | | |
| Snail | | | | | | | | | | | | | | | |
| Limpet(hat) | | | | | | | | | | | | | | | |
| Barnacle | | | | | | | | | | | | | | | |
| Crab | | | | | | | | | | | | | | | |
| Sand Flea | | | | | | | | | | | | | | | |
| Insect | | | | | | | | | | | | | | | |
| Fish | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | |
| TOTAL ANIMALS | x | x | x | x | x | x | x | x | x | x | x | x | | | |
| PLANTS | | | | | | | | | | | | | | | |
| Pink Algae (Sq.inches) | | | | | | | | | | | | | | | |
| Red Seaweed | | | | | | | | | | | | | | | |
| Brown Seaweed | | | | | | | | | | | | | | | |
| Green Seaweed | | | | | | | | | | | | | | | |
| Grass | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | |
| TOTAL PLANTS | x | x | x | x | x | x | x | x | x | x | x | x | | | |



Student Names_____



Along the transect, locate the wire squares your have prepared so that they are at regular intervals along the line (ie, every 3 meters). If you are using more than 1 transect, transect lines should be placed so that they cross representative areas of the shore.

When the transect lines and squares have been laid out, devise a means of marking their locations so that you can return a year or more later and still locate the same places. You may wish to plant stakes or devise some other system.

2. Photography

Materials -
camera
film

Method

Photographs may be taken to help identify the location of the site and transects in the future. Include the entire study area and photos of individual plots with their meter numbers showing.

Keep this photo record for reference. In ensuing years it may help you locate the position for transect lines.

3. Mapping

Materials -
paper and pencil

Method

Assign one or a few students to draw maps of the area, showing prominent features, the horizontal limits of the study area, and any obvious changes in surface type(sand, bedrock, boulder) or lines of zonation (barnacle, rockweed, mussels, etc.)

Record Keeping

When the study area has been surveyed, mapped, and photographed, and the transects and study plots are laid out, you are ready to begin the sampling. All data should be kept in some systematic way. "Rite in the Rain" books or loose sheets (with clipboard) are perhaps the best choice for work in rainy, coastal areas. Notebooks could be kept by individuals or by groups but in either case, one way or another, class notes should encompass the following:

1. Name of investigator
2. Date
3. Location of study site
4. Description of area (substrate, prominent features, etc.)
5. Record of maps, sketches, photos taken
6. Description of transect lines laid - their location and the number of individual plots and their intervals

When this and any other information that seems significant has been recorded, students are ready to note and record biological information from the individual plots. This information should be kept in the same notebook as the more general information.

4. Examination of individual plots

Materials -

notebooks
rulers or calipers for measuring animal sizes

Method

Divide students into groups or assign individual students to plots. Each plot should be examined carefully and the following information should be taken and recorded:

1. species present in the plot - give the common name, or a description for each kind of animal
2. for each kind of animal, measure the largest and smallest individual, and determine the size of an average individual (the average size may be an estimate)
3. Count (or if not possible, estimate) the number of individuals of each species in the plot
4. note any unusual behavior or appearances

When each plot has been carefully examined and records made, you are ready to pack up your coathangers and go back to school. Before you leave the site, double check on your stakes or other markers to be sure that they are secure and in place.

Follow up Activities

1. Charting the data

Materials -

blackboard space or large paper such as newsprint

Method

Involve students in deciding how best to represent their data on a chart. Then prepare the chart.

2. Summarizing the data

Method

Summarizing might be done in any of several ways. You might, for example, use chart paper and make a list of all the species observed, then check in the appropriate column for each transect or plot in which that species occured.

Involve students in summarizing their observations -

- What species were most abundant?
- What species were most widely distributed?
- Was there much size range within individual species?
- What species were found but were represented only by a few individuals?

Emphasize to students that their data will be kept and will be compared with additional data taken the following year at the same time. (Or if interest, weather, etc. permits, repeat the above sampling scheme on a seasonal basis, once in fall, winter, and spring, for example, to measure seasonal change in the study area)

If you have had contacts with agencies involved with a proposed project, you may want to share the student data with them. This would show the students the importance of their work and involve them in being part of a real process.

3. Research - Involve students in selecting one of the animals they observed at the shore and making it the subject of a written or oral report. The report could involve both student observations of behavior, habitat preference, etc., as well as material gleaned from literature. (If you have scientific facilities in you community, this would be a good opportunity to students to become familar with the library of that facility.)

4. Analysis - In class, analyze the local development proposal for your study site in terms of the guidelines the class originally agreed upon to represent their interests in the marine environment.

5. Films - View any of the following appropriate films (all available from the State Library):

Life in the Woodlot
Rise and Fall of the Great Lakes
Swimming Hole

6. Symbol reconsideration - Now that you have completed the unit studying the marine environment, involve students in a reconsideration of the symbol for the marine environment that they designed at the beginning of the study. Would they now revise it in any way? Does it still represent the ideas that they feel are important?

If no symbol was designed in the beginning of the study, devise one now as a summary activity.

III. RECOMMENDED FILMS

A. Choices for the Coast
Video cassette from Coastal Zone Management
Available for State Library

B. Kachemak Bay (Outer Continental Shelf Oil Drilling)
Film from Coastal Zone Management
Available from State Library

C. Uncertain Summer (Yakutat preparing for oil industry)
Film from Coastal Zone Management
Available from State Library

D. People of the Yukon Delta (Subsistence Life styles in Transition)
Video cassette from State Library

E. At the Crossroads (Endangered species)
Film from State Library

F. Edge of the Barrens (Delicate balance of subsistence lifestyle)
Film from State Library

G. Life in the Woodlot (Ecology)
Film from State Library

H. Rise and Fall of the Great Lakes (Ecology)
Film from the National Park Service

I. Swimming Hole (Ecology)
Film from the National Park Service

IV. RECOMMENDED BOOKS (with the help of Sue Jensen, Auke Bay)

A. Who Killed Cock Robin? George, Jean C.
Two friends investigate the death of a robin and indict air, water and soil pollution. (Intermediate level)

B. Alvin Fernald, Superweasel, Hicks, Clifford B.
Another victory over pollution by great brain Fernald and his army of friends. (Intermediate level)

C. The Mushroom Center Disaster, Bodecker, N.M.
An assortment of insects living in a quaint and tidy community of mushroom houses becomes the victim of littering humans. Under the guidance of an enterprising beetle, the village recycles a huge pile of refuse into usable items.

D. Where the Sea Breaks Its Back, Ford, Corey
The epic story of Stellar, a pioneer naturalist, and the discovery of Alaska. A good read aloud, at the Juneau Memorial Library.

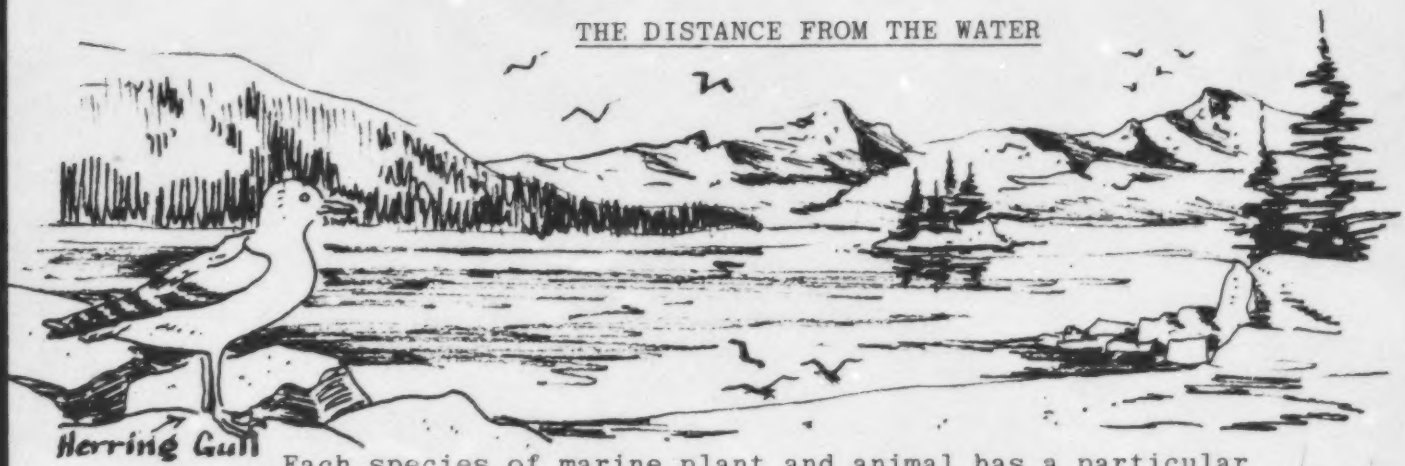
TEACHER INFORMATION
FOR
SEA WEEK CURRICULUM MATERIALS

*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

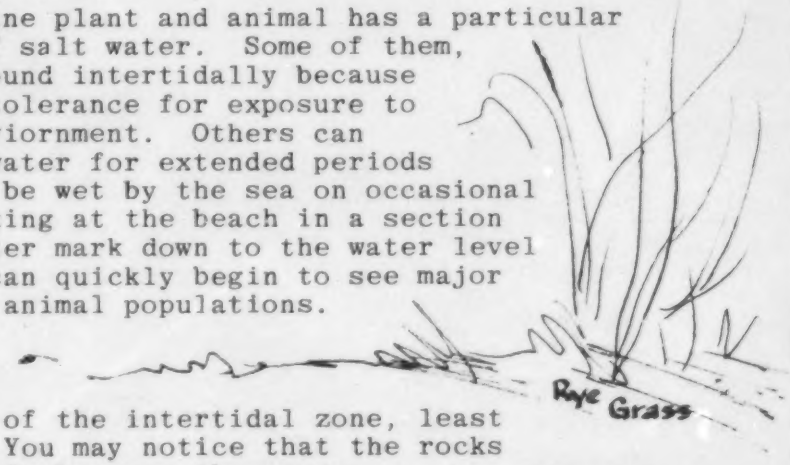
SIXTH GRADE

| Name of Sea Week Materials | Contents and/or Use |
|---|---|
| ACTIVITY BOOK | 16 pages of multi-use worksheets |
| Worksheet # 1 - Distance from Water | Reading, Discussion |
| Worksheet # 2 - Intertidal Animals | Labeling |
| Worksheet # 3 - Intertidal Animals | Labeling |
| Worksheet # 4 - Fish and Fisheries | Labeling, Fill in Words |
| Worksheet # 5 - Fish and Fisheries | Writing, Discussion |
| Worksheet # 6 - Marine Mollusks | Fill in Blanks |
| Worksheet # 7 - Lowest Zone | Reading, Discussion |
| Worksheet # 8 - Questions | Fill in Writing |
| Worksheet # 9 - Common Alaskan Birds | Information |
| Worksheet #10 - Common Alaskan Birds | Information |
| Worksheet #11 - Common Alaskan Birds | Information |
| Worksheet #12 - Common Alaskan Birds | Information |
| Worksheet #13 - Birds of Sea & Shore | Labeling |
| Worksheet #14 - Birds You Know | Fill in Information |
| Worksheet #15 - Bird of Sea & Shore | Writing |
| Worksheet #16 - Birds of Sea & Shore | Answers |

## THE DISTANCE FROM THE WATER

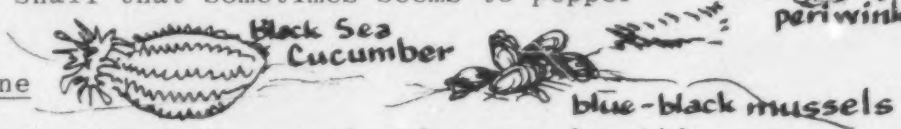



Each species of marine plant and animal has a particular tolerance to being out of salt water. Some of them, for example, are never found intertidally because they have absolutely no tolerance for exposure to the effects of an air enviornment. Others can stand being out of salt water for extended periods of time, needing only to be wet by the sea on occasional very high tides. By looking at the beach in a section from its highest high water mark down to the water level on a low, low tide, you can quickly begin to see major differences in plant and animal populations.



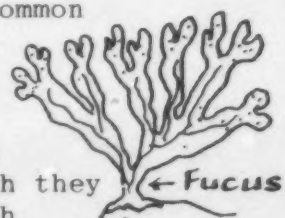

### The Highest Fringe

At the upper limits of the intertidal zone, least life forms are evident. You may notice that the rocks appear black here. This is because they are covered by a black encrusting lichen or by a blue-green alga that makes these rocks treacherous and slippery when wet. In these upper reaches, too, may be found the common tiny periwinkle- a fat, ridged snail that sometimes seems to pepper the rocks.




### The Middle Zone

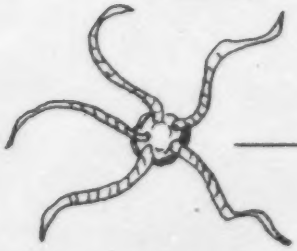
As you move down toward the water's edge on a low tide, you will be aware of obvious color bands or patches on the beach. There may be banding of Fucus, the common brown rockweed, and of blue-black mussels (the intertidal - and subtidal - bivalve that attaches itself by tiny threads to rocks and pilings and other surfaces), and barnacles. Here too you will begin to see limpets (the species of which are sometimes most quickly identified by how low or high they are found on the beach), amphipods, various starfish, tiny black sea cucumbers, and other forms of life there were not in evidence at higher levels.

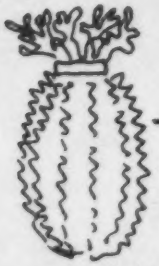
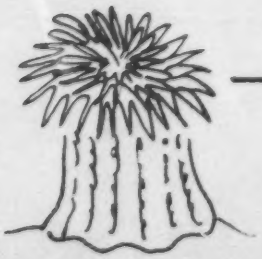


Worksheet: 6th grade

# Intertidal Animals:

Here are some drawings of common intertidal animals. In the boxes - write the names of the animals. Check their habitat. (Some animals may live in more than one zone)

| Name | Rocky Shore | Sand/Mud |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
|  | | |

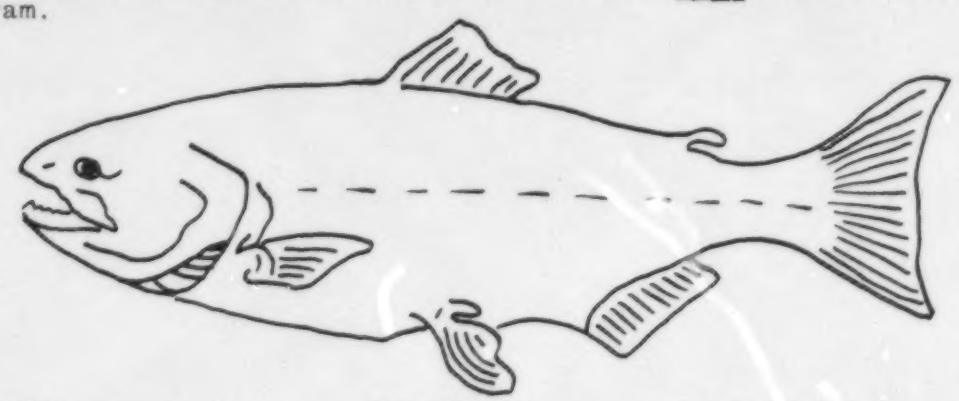
| Name | Rocky Shore | Sand / Mud |
| --- | --- | --- |
| | | |
| | | |
| | | |
| | | |
|  | | |
| | | |
| | | |
|  | | |

Worksheet - 6th Grade

# FISH and Fisheries

DIRECTIONS: Read the questions and answer the questions. Use the poster, "Game Fishes of Alaska" and other reference materials to help you.

1. How well do you remember the parts of a Fish? Label the following diagram.



gill cover  dorsal fin  adipose fin  caidal fin

pectoral fin  ventral fin  anal fin

2. What are the five kinds of Salmon found in Alaskan waters?

1. _____  4. _____

2. _____  5. _____

3. _____

3. Describe, briefly, the general life cycle of a salmon. You may use pictures to help.

Worksheet - 6th Grade

# Fish and Fisheries

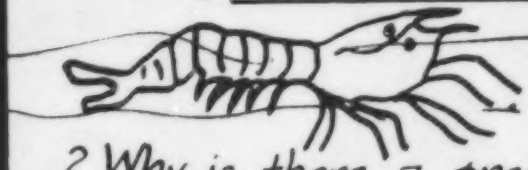
Directions: Read the questions and write the answers in the spaces. Use reference books to help you.

1. What marine animals, besides salmon, support commercial fisheries in Alaska?

1. _____ 4. _____

2. _____ 5. _____

3. _____ 6. _____



2. Why is there a great deal of interest in fish hatcheries in Alaska?

_____

_____

_____

_____

_____

_____

_____

_____

_____

*Note:

Don't worry if you didn't remember all the answers!
Class Discussion will refresh your memory.

# Marine Mollusks

Directions: Fill in the blanks with the correct word chosen from those listed below. Some words must be used more than once.

| | | |
|---|---|---|
| bivalve | limpets | clams |
| octopuses | squids | foot |
| snails | chitons | cockles |
| mollusks | univalves | siphons |

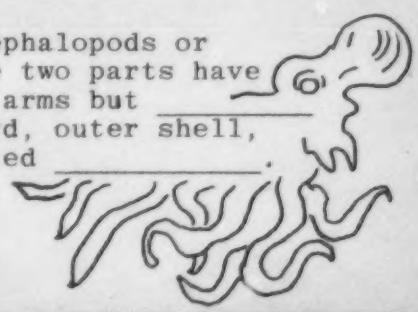
The shell-bearing animals of the sea are called _____. In every case, these animals have soft bodies and they usually have a large muscular foot on which they move. Their bodies are usually protected by a limy shell which the animal makes. Sometimes, however, the shell may be internal or may be absent. Four kinds of _____ are found in shallow Alaskan waters. They are described below:

1. Animals with one part to their shells are called _____. These include such animals as _____ and _____. _____ are animals with coiled shells and they can be found in many shapes and sizes. _____, which are sometimes called chinamen's hats, have cone-shaped shells and house animals that feed by scraping microscopic material from rocks or other surfaces.

2. Unlike _____ which have one part to their shells, _____ have shells with two parts or valves. Many of these animals, such as _____ and _____ live buried in the sand or mud, and if they have a large _____ which is used to dig them deep beneath the beach surface, and two _____ which are often part of a neck that reaches to the sand or mud surface so the animal can take in sea water and remove from it the tiny food particles it needs to live.

3. Animals with eight plates or parts to their shells are called _____. The plates are usually visible but sometimes they are partly or entirely covered by softer parts of the animal's body. _____ usually live on rocks, often in areas where there are heavy waves. Because they can cling tightly to the rocks and shape to them, they can withstand strong seas.

4. _____ and _____ are called cephalopods or "head-foot" animals because in them these two parts have become joined. _____ have eight arms but _____ have ten. While neither animal has a hard, outer shell, they still belong to the large group called _____.



## The Lowest Zone

As you approach the water's edge, you will not find some of the plants and animals that were evident at higher levels. In general, however, the lower you go in the intertidal zone the greater the diversity of life forms you will find. Here you will find sea urchins, a wide variety of often large starfish, perhaps juvenile king crabs, large white or varicolored sea anemones (if they are out of water, these will look like squishy, uninviting blobs, but look out into the shallow waters to see the same animals in all their expanded glory), and the larger snails.

So...as you look at any particular beach for the first time, there is a great deal to think about. Remember that each part of the beach, each kind of surface type, each height from the water, each kind of topographical variation indicates what life may be found there. In general, it is advisable to spend the lowest part of the tidal cycle closest to the water's edge for in that way you will have the maximum amount of time to spend along the beach area that is revealed to us least often and which tends to harbor the greatest diversity of plants and animals.

## QUESTIONS FOR "THE DISTANCE FROM THE WATER"

1. What are two examples of the tolerances of marine plants and animals to being out of salt water?

   1. _____

   2. _____

2. What are two life forms you could find at the upper limits of the intertidal zone?

   1. _____

   2. _____

3. What are six life forms you could see in the middle zone?

   1. _____

   2. _____

   3. _____

   4. _____

   5. _____

   6. _____

4. What five marine life forms could you see at the lowest zone?

   1. _____

   2. _____

   3. _____

   4. _____

   5. _____

5. What is the best way to spend your time at the beach?

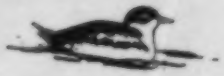
_____

_____

_____

_____

## Sea Birds

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  | ☐ Murrelet, Marbled | M | Swim | Small, Pointed | Salt water | Small, mottled brown | Southeast AK to Cal. |

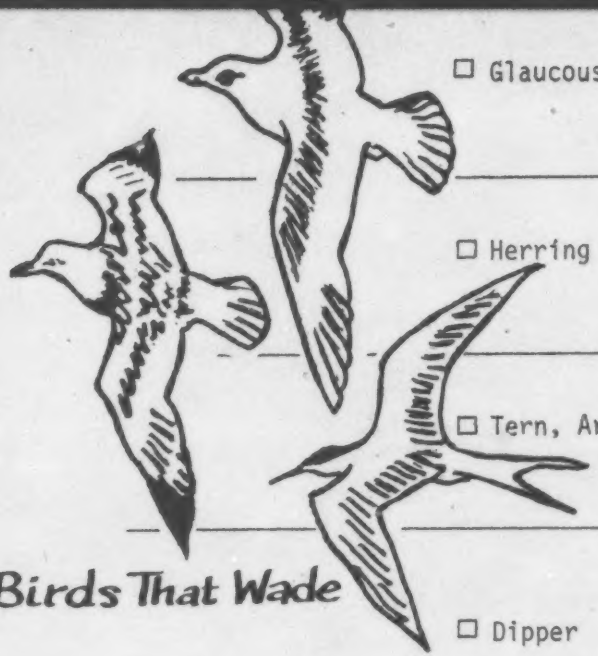
## WATERFOWL

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ☐ Bufflehead | ML | Swim | Wedge shape | Salt water | Smallest duck, black and white | Coastal AK to Mexico |
| | ☐ Goldeneye, Barrow's | L | Swim | Wedge shape | Salt water | Black and white | Coastal AK to Cal. |
| | ☐ Goose, Canada | VL | Swim | Wedge shape | Water, wetlands | White cheek patch | Coastal AK to Cal. |
| | ☐ Green-winged Teal | L | Swim | Wedge shape | Fresh water, salt water | Small duck, green wing patch | Cal. to Mexico |
| | ☐ Harlequin | L | Swim | Wedge shape | Salt water, streams | blue body with white streaks (male) | Coastal AK to Cal. |
| | ☐ Mallard | L | Swim | Wide, flat | Wetlands | Green head, grey back | Coastal AK to Mex. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ☐ Merganser, Common | L | Swim | Long, toothed | Water | Flat, reddish head, white chest | |
| | ☐ Pintail | L | Swim | Wide, flat | Wetlands | Pointed tail | Cal., Mex., Hawaii |
| | ☐ Scaup | L | Swim | Wide, flat | Salt water | Black, grey back | Coastal AK to Mex. |
| | ☐ Scoter, Surf | L | Swim | Wide, flat | Salt water | Black, white head patch | Coastal AK to Mex. |
| | ☐ Scoter, White-winged | L | Swim | Wide, flat | Salt water | Black, white wing patch | Coastal AK to Mex. |
| | ☐ Swan, Whistling | VL | Swim | Wide, flat | Lakes, air tidelands | Long neck, white | California |

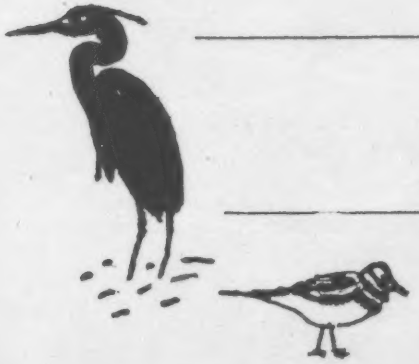
## Gull-Like Birds

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ☐ Bonafarte's | ML | Swim | Hooked | Beaches, tidelands | Black head, small gull | Wash. to Mexico |



## Birds That Wade

| | | | | | | |
|---|---|---|---|---|---|---|
| ☐ Glaucous-winged | L | Swim | Hooked | Beaches, dump, fish streams | Large gull, grey wings | Coastal Alaska to Mexico |
| ☐ Herring | L | Swim | Hooked | Beaches, dump, fish streams | Large gull, black on wing tips | Coastal Alaska to Mexico |
| ☐ Tern, Arctic | ML | Swim | Hooked | Tide flats, glacier | Orange bill and feet, forked tail | Chile to Antarctica |
| ☐ Dipper | M | Grip | Sharp, pointed | Streams | Grey, bobs body up and down | Coastal Alaska |
| ☐ Dunlin | S | Long legs | Long, pointed | Beach, mudflats | Rusty back, black belly | Coastal Alaska |
| ☐ Heron, Great Blue | VL | Long legs, toes | Long, pointed | Beach, fish streams | Bluish color, tall | Coastal Alaska |
| ☐ Killdeer | S | Long toes, legs | Pointed | Beach, fish streams | Two black stripes on breast | Wash. to Central America |



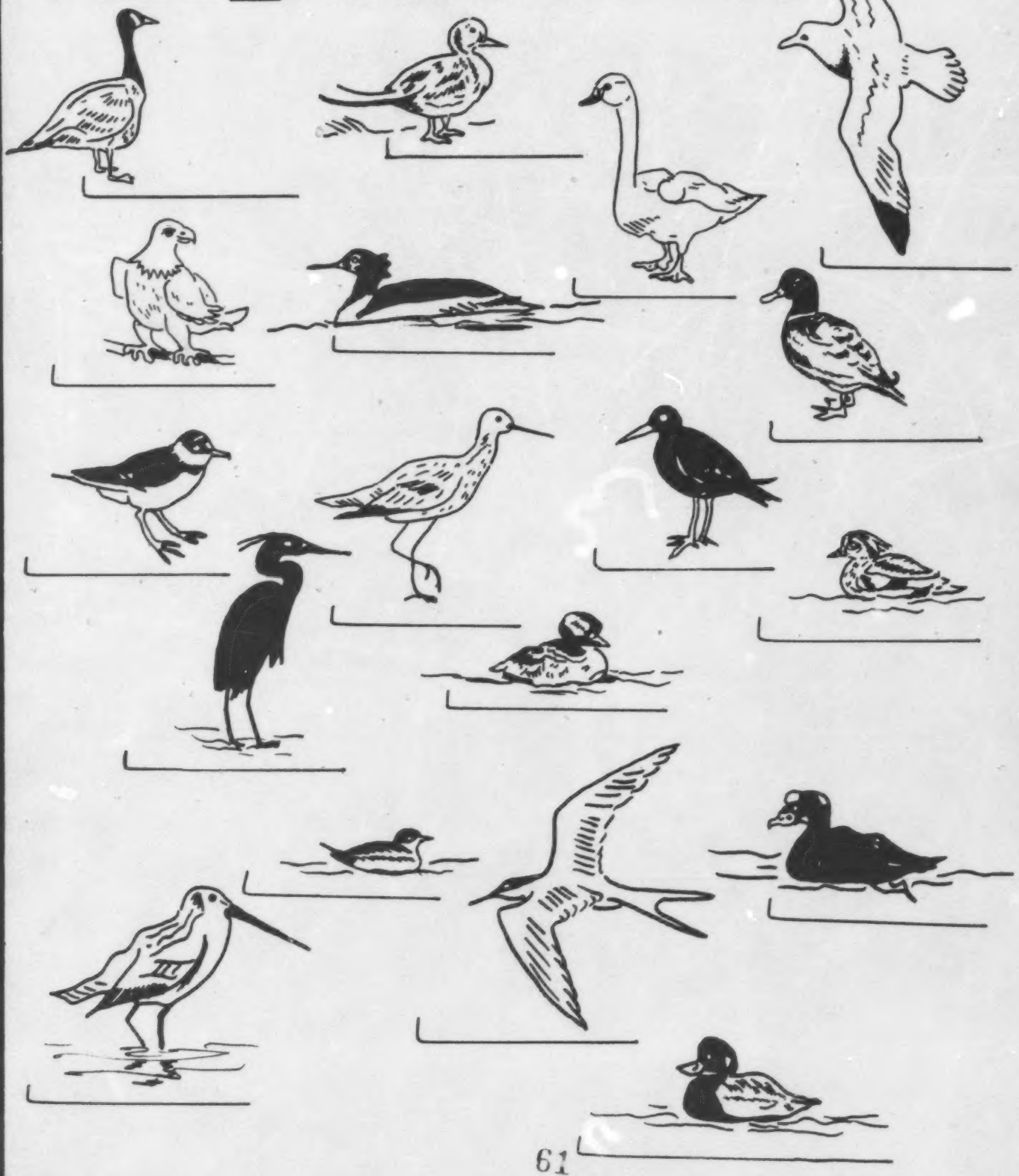
| | | | | | | |
|---|---|---|---|---|---|---|
| ☐ Oystercatcher, Black | M | Long toes, legs | Long, flat | Islands, reefs | Black with orange bill | Coastal Alaska |
| ☐ Plover, Semipalmated | S | Long toes, legs | Medium pointed | Mudflats, beach | One black stripe on breast | Cal. to S.America |
| ☐ Sandpiper, Spotted | S | Long toes, legs | Medium pointed | Mudflats, sandy places | Spots on breast | Cal. to S.America |
| ☐ Sandpiper, Western | S | Long toes, legs | Medium pointed | Mudflats, beach | Very small | Cal. to S.America |
| ☐ Snipe, Common | S | Long toes, legs | Long, pointed | Swampy places | Long bill, short legs | Coastal Alaska to South America |
| ☐ Yellowlegs, Greater | S | Long toes, legs | Long, pointed | Mudflats, beach | Yellow legs | Cal. to S.America |

## Birds of Prey

| | | | | | | |
|---|---|---|---|---|---|---|
| ☐ Eagle, Bald | VL | Grasp | Sharp, hooked | Coast, salmon streams | Adults nave white head and tail | Coastal Alaska |

# Birds of Sea and Shore

1. Write the name of each bird under the illustrations.



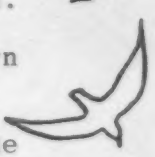
# Birds You Know

Directions: Using a reference book* complete the following table. Begin by listing birds that you know and/or have seen recently.

| Name of Bird | Description: Include colors, type of beak and feet, size, etc. | When did you See it? | Where did you See it? |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

*Suggested reference books:

1. Birds of North America by Robbins, Brunn, Zimm.
2. Field Guide to Western Birds by Roger Tory Peterson.
3. Audubon Field Guide to North American Birds, Western Region.
4. Birds in the Alaska Coastal Environment, Fourth Grade "Sea Week" materials.



# Birds of Sea and Shore

Directions: Answer the following questions. Use bird reference books to help you.

1. Name 5 types of birds that can be found along Alaska's shores

   1. _____
   2. _____
   3. _____
   4. _____
   5. _____

2. Give reasons why these birds are found along Alaska's shores.

   _____

   _____

   _____

   _____

   _____

3. How might changes man makes to the shore or shore line affect the kinds and numbers of birds using the shore?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

# Birds of Sea and Shore

Directions: Answer the following questions. Use bird reference books to help you.

1. Name 5 types of birds that can be found along Alaska's shores

   1. (sea birds) _____
   2. (waterfowl) _____
   3. (gull-like birds) _____
   4. (wading birds) _____
   5. (birds of prey) _____

2. Give reasons why these birds are found along Alaska's shores.

   _____

   _____

   _____

   _____

   _____

3. How might changes man makes to the shore or shore line affect the kinds and numbers of birds using the shore?

   _____

   _____

   _____

   _____

   _____

   _____

   _____

# STEPS TO ORGANIZING A SEA WEEK IN YOUR COMMUNITY

I. Familiarize yourself with the Sea Week curriculum and introduce it to other interested teachers and parents.

II. Catalog the resources in your area. Where are the good beaches? When are the good low tides? Are there any agency, hatchery, or museum personnel that would be available as speakers and/or for field trips?

III. Draw up a well-thought out plan for Sea Week and present it to your administrators for approval.

IV. Talk to teachers in the upper grades about having some of their students accompany you on your field trips. Brief them ahead of time as to the activities you'll be doing.

V. Make up a calendar of when speakers will talk, which movies will be shown, and when each class will take their field trips. By arranging two field trips near one another in location, or by having the second class come to the beach when the first field trip of the day is leaving, gas (and energy) can be saved by having fewer bus trips.

VI. Invite the whole community to participate - parents, chamber of commerce, governmental agencies, native corporations, fishermen, etc. Parents can assist with field trips; businesses might display student artwork. If community organizations are interested, the week can become a Festival of the Sea, with boat tours, movies, speakers, games, and dances. Contact your local paper about featuring Sea Week with a photo and story - beforehand, during, and afterwards! Radio stations might want to interview field trip leaders - or read stories that students have written.

VII. Spend an entire week studying the amazing ocean! Math problems, writing assignments, spelling words - can all relate to our marine environment. Show your students the wonder of sea life!

## SUGGESTED FIELD TRIPS

In planning field trips for your class two things should be considered: 1. The emphasis in Sea Week studies at your grade level. 2. The available community resources.

Consider visiting a place - beaches, docks, vessels (fishing, pleasure, ferry, barge, tour ship, Coast Guard), cold storage plant, canneries, supermarket, government research facilities, hatcheries. Museums, private collections and stores might be considered for indoor trips. Arrangements might be made to watch someone at work - fisherman, biologist, or Coast Guard personnel. If your students have an opportunity to visit another community you might include Sea Week activities in your itinerary or might include the entire trip around them.

In planning any trip, if possible arrange for knowledgeable persons to accompany your group. The involvement of interested parents is also valuable.

## SIXTH GRADE

I. Beach field trips -

A.1.Undeveloped beach - where development is planned.
   a. Review intertidal life.
   b. Identify and record life found there as recommended in the Guide.
 2.Developed beach -
   a. Identify what man has done.
   b. Assess damage to sea life.

City Planning Department can identify planned development site.

Coastal zone management plans and personnel can be utilized at this grade level.

B. National Marine Fisheries -
State Dept. of Fish and Game -
Coast Guard -
All have information and programs on habitat protection and pollution control.

## WHAT TO DO ON THE BUS

Put together a checklist of objects (or use the one that follows) that the students may see at the beach. During the bus ride, students can circle the name (or picture) of each object that they think they will be seeing during the field trip. At the beach, they can check off the objects they actually saw, and estimate or count how many they saw. A Juneau teacher makes her checklists into a small book, with a pencil attached by yarn, and gives each pupil a sandwich bag in which to store his/her checklist.

| | | | |
|---|---|---|---|
| bus | _____ | cow | _____ |
| can | _____ | raven | _____ |
| fish | _____ | sheep | _____ |
| tree | _____ | driftwood | _____ |
| gull | _____ | boat | _____ |
| buoy | _____ | moose | _____ |
| anemone | _____ | dock | _____ |
| whale | _____ | starfish | _____ |
| seaweed | _____ | house | _____ |
| crab | _____ | airplane | _____ |
| bottle | _____ | fisherman | _____ |
| jellyfish | _____ | limpet shell | _____ |
| sand flea | _____ | sea urchin | _____ |
| mussel | _____ | porpoise | _____ |

# CONSERVATION

Conservation may be defined as the "wise use" of our natural resources. It is not the non-use of them, but rather a use that comes after careful thought has been given to the reasons and consequences of that use.

It is perhaps trite to say that with increasing population pressures, the ever-increasing need for raw materials, for recreational facilities for homesites, etc., pressures increase on a natural environment that may previously have been untrammeled and in no need of someone to prote it from total alteration. Here in Alaska, particularily, the residents of the State are faced with making many immediate far-reaching decision about the natural environment of our State. What man's impact on it will be and if and how that impact should be limited or controlled are some of these decisions.

Conservation, practically, comes down to a few important principles:

1. Every living thing, as well as non-living thing, has a place and function in the balance of existence on the surface of this planet, whether or not we happen to know what its precise niche is. "Everything is connected with everything else." "Everything affects everything else." Destruction of one species, useless and unimportant though that species may seem to our ignorance, can have wide-reaching repercussions.

2. Natural resources are exhaustible. Populations which drop below a critical threshold cease to reproduce and the species plummets into extinction. Energy resources on earth are not renewable. Extinction of living species and exhaustion of non-living resources are natural processes. Trilobites went extinct before men appeared on the scene. Volcanoes spew noxious gases into the air. Nevertheless, the speed with which man, especially 20th century man, is destroying or using up extant life and resources is astronomical compared to natural processes

3. Since man is an intelligent being, he can, if he will, desist from extinguishing life and exhausting the resources of the earth. Man can practice conservation without denying himself a full and enjoyable life. His reason for using resources wisely may be an idealistic appreciation of all that nature has and is, or it may be a realization that our tomorrows will be poorer unless wisdom regulates usage of our goods.[1]

For school children studying Alaska's marine life, conservation involve a few simple, yet extremely important principals:

1. DO VISIT THE BEACH AND ENJOY YOUR TIME THERE BUT WHEN YOU LEAVE, LET THE AREA BE THE SAME, OR BETTER, THAN YOU FOUND IT.

2. IF YOU TURN OVER A ROCK TO SEE WHAT IS HIDING UNDER IT, TURN IT BACK OVER WHEN YOU HAVE FINISHED. (What lives there may depend for survival on the exact kind of micro-habitat that exists under that rock.)

[1] Reef and Shore. Hawaii Nature Study Program for Elementary School Children, p. 4.

3. IF YOU PICK UP ANIMALS FOR CLOSER VIEWING, DISTURB ONLY THE ONES YOU WANT TO LOOK AT, HANDLE THEM CAREFULLY, THEN REPLACE THEM WHERE YOU FOUND THEM. SEA CREATURES CAN LIVE OUTSIDE OF THE WATER ONLY BRIEFLY. A PAN OR BUCKET OF SEAWATER WILL ALLOW CLOSER EXAMINATION AND REDUCE STRESS ON THE ANIMAL. KEEP THE CONTAINER OUT CF DIRECT SUNLIGHT AND REPLACE THE WATER IF IT BEGINS TO WARM. HANDLE FISH WITH WET HANDS TO PRESERVE THEIR PROTECTIVE SLIME AND IN HANDLING CRABS AND JELLYFISH - WATCH OUT FOR STINGERS AND PINCHERS. PICK CRABS UP FROM THE BACK AND SUPPORT THEIR UNDERSIDE WITH THE PALM OF YOUR HAND. DON'T TOUCH JELLYFISH.

4. IF YOU WANT TO USE LIVE MATERIALS IN THE CLASSROOM AFTER THE FIELD TRIP TO THE BEACH, TAKE ONLY WHAT YOU WILL NEED, TAKE CARE TO KEEP IT ALIVE, AND RETURN IT TO THE BEACH WHEN YOU ARE FINISHED WITH IT.

5. NON-LIVING BEACH MATERIALS MAY BE COLLECTED BUT USE MODERATIC HERE, TOO. IF MATERIALS ARE FOR CLASS USE, HAVE A PROJECT IN MIND BEFORE YOU BEGIN COLLECTING AND THEN GATHER ONLY WHAT YOU WILL NEED. YOU MAY WANT TO GATHER DRIFTWOOD, STONES, BITS OF POLISHED GLASS. UNLESS YOU ARE A SECOND GRADE TEACHER,.HOWEVER, PLEASE COLLECT ONLY A FEW, IF ANY, EMPLY SHELLS LEAVING THESE MATERIALS FOR THE SECOND GRADERS WHOSE ONLY SEA WEEK BEACH AND CLASSROOM ACTIVITY IS STUDYING THEM.

# A CHECK LIST

# FOR

# A FIELD TRIP TO THE BEACH

You the teacher:

1. Be sure you are personally familiar with the beach to which you and your class are going. If you have not been there before, take a bit of time after school or on the weekend to go to that beach and walk it carefully. By being familiar with it yourself, you can anticipate what your students will be able to see and do there.

2. Check carefully on all bus arrangements for your class. Be sure that a bus is scheduled for you and be aware of the delivery and pick-up times.

3. Arrange for adequate adult supervision. Usually there is no problem in finding parents willing to go along. Often junior or senior high school students may also be available and, if they are taking biology or other related science courses, they can be very helpful. One older student or adult for every five or six children would be a good ratio in terms of safety, control, and learning.

4. Give careful thought to what you will do with your time at the beach. The beach is an exciting place just to explore, but some thought and directions given to the activities to take place will make the experience richer and more profitable for students and you, too.

5. Meet - or at least talk by phone - with your volunteers before the field trip to acquaint them with your plans for the outing. Be sure that each of them knows specifically what you would like each to do. Recommend that they attend appropriate training workshops and provide them with information from this guide or elsewhere.

6. Well in advance of the beach trip itself, begin preparing your students for their experiences there. The better prepared they are, the more successful the field trip will be.

7. Letters should be written to all parents, including permission slips, so that parents know about the activities in which their children will be involved.

8. Collect and ready all materials you will need for the field trip - buckets, pans, binoculars, camera, whatever it is you need. You might consider bringing or arranging for some kind of snack at the beach - a big bag of gorp (M & M's, raisins, salted peanuts, etc.) always makes a hit and a snack can serve

to reorganize matters at the beach and create a natural (though slightly contrived) change of pace and focus. (see the suggested time plan that follows.) Be sure to take along a supply of bandaids - or better yet, a small first-aid kit - just in case there is a need for it.

9. Plan the trip ahead, but allow for flexibility. If a whale is breaching just off shore while you are trying to teach the life and ways of a barnacle, your students will not be absorbing much of your lecture. Be prepared to take advantage of those special events that occur so often along our shores.

The students:

1. Involve them in preparing for the field trip as much as possible.

2. Explain to them any rules for field trip conduct. Stress especially the fact that the beach is a special environment and a fragile one whose beauty comes from the LIVING plants and animals to be found there. Impress upon them the need to respect the life forms they will see, to leave the beach as nearly like they find it as possible and not to collect or molest live beach animals unless you, the teacher, have very specific and well thought out needs for limited quantities of live animals and materials for use in further teaching processes and have requested the students help you gather materials.

3. A quick talk about safety at the beach would not be out of place - the need for proper clothing, care to be taken on rocks that are slippery when wet, what to do in case of injury, always keep an eye on the tide to be sure you are not stranded or lose gear to the rising waters, etc.

4. If a class project is planned for the beach time, help students to prepare or gather materials they will need to take with them.

BOTH teacher and students:

BE PROPERLY DRESSED. It is always difficult to predict what the weather will be in coastal Alaska but there is often a good chance that there may be rain. Be sure everyone knows that he or she should come dressed warmly and prepared for rain if that prospect seems at all likely. Wearing layers of clothes always makes sense - a short sleeved shirt, then something with long sleeves, topped by a sweater or warm jacket and something water and wind-proof. Foot gear is important. Layer socks for maximum warmth and wear RUBBER boots if possible. Carrying a back pack is a good idea for students and teachers alike. It leaves your hands free, lets you store away layers of clothes you want to shed or don't need at the moment and is a good place to keep the snack you and/or the students have decided to bring along.

## SUGGESTED ON-SITE ORGANIZATION

The beach is an exciting place on your first visit there or your five hundredth and the most normal and natural thing to do on the beach is to walk - or run - along the shoreline to see what is there for the finding. If your class has been working hard on sea related studies and has carefully outlined what they want to do with their time at the beach, then perhaps all students will set right to work with whatever tasks have been outlined beforehand. But, if a less structured approach seems to be in order, you might try the following idea...

Part I

If, before the beach experience, you have been working in the classroom with the students on the particular area of marine knowledge outlined for your grade level, then the students should have a good idea of particular concepts or kinds of life or situations they might look for at the beach. Students could have the first half of the time at the beach to apply their knowledge in a free kind of framework. That is, for example, if you are a second grade teacher and have been studying shells with your students, give them the first part of their time at the beach to see how many different kinds of shells they can count, or give them some other similar kind of task that they can carry out and at the same time still be free to explore other aspects of the beach.

Part II

At the mid-point of your allotted time at the beach, gather the children together. Taking a bit of time out to open that big bag of gorp, or gathering for some other kind of snacking, works to draw everyone together, change the pace and focus.

After the quick energy break is a good time to have the students sit down quietly and talk about what they have seen or to have adult helpers work in small groups with children to share further discoveries or knowledge about materials found on the beach. As an example, if you are a first grade teacher who has been studying marine animals with your class, each adult helper might have been assigned to gather in a bucket - with the children's help - examples of a particular group of animals during the first part of the time on the beach. Then, during the second half of the beach time, each adult and his or her bucket of materials might circulate from one small group of children to the next, encouraging them to touch, feel, observe certain characteristics or qualities of these particular animals.

Children need both to enjoy the beach just for the pleasure there is in being there and to grow in understanding the complex web of life and environmental factors that are at work there. If careful thought and planning have gone on well before the actual trip to the beach, there is every reason to believe that both these goals can be accomplished.

## A LOOK AT THE BEACH

Any beach is as individual in its own way as are we who, as individuals can be distinguished from all other people. Just as each of us represents only one combination out of the many possible, so it is with beaches. A beach is a place where the sea confronts the land, and every aspect of that sea and that land edge is important in determining what the general appearance of that beach will be and what kinds of plants and animals will grow and thrive in that particular environment. Many factors combine to determine the personality of that unique and special place.

### The Sea

If we think first about the water at the beach, we realize that there are several ways in which it can vary. To begin with, for example, those of us living in the Juneau area look out to waters that are relatively protected. That is, our beaches are not subjected to the open, powerful swells that are common on coast lines that abut the open ocean. Unlike conditions that might be found at Sitka, for example, the wave conditions along our beaches are always relatively mild and non-violent. Even in the Juneau area, however, local differences in topography influence the personality of the beach. Whether a particular beach area is a straight, uninterrupted stretch, a deep or shallow cover, or a jutting point will influence the force and effect of the waves upon the shore. Consequently, we might expect to find different kinds of life on a point, in a cove, or on a straight, uncomplicated shoreline because each species has a particular ability to withstand greater or lesser wave force.

We all know that the sea is salty but we may not all realize that the concentration of salt in sea water can be highly variable. In the open ocean, salt concentrations measure about 32 to 33 parts per thousand. In our inside waters around Juneau, the average salt concentration in main channels may be slightly less than that because of the greater influence of fresh water entering from streams and rivers. At the mouths of the streams and rivers themselves, where salt and freshwater mix, salt concentrations are very low. Because each kind of marine plant or animal has its own built-in tolerances to varying saltiness or freshness, these living populations vary with the salinity prevalent at a particular place.

## THE SIZE OF PEBBLES

If you stand on a beach and look thoughtfully at it, one of the first things you will notice is its texture - whether it it sandy, gravelly, composed of cobbles, bedrock, mud or a combination of two or more of these. The nature of the beach is critical in determining what can live there. Let's examine each kind of substrate in turn to see what kind of life we might expect to find.

Mud

Mud can be anything from relatively porous sand-soil mix to the clay muck that sucks rubber boots right off your feet. If you look at the surface of this kind of substrate, you will be aware of little, if any, life. Here and there you may see the flexible tubes of mud dwelling worms sticking up an inch or so above the surface. Or you may see "cake decorations" left by other burrowing worms. Finally, you may be aware of the presence of clams by the squirts of water and the siphon holes in the mud. Digging with a shovel will reveal the various inhabitants of the mud in all their glory - fat, bulbous peanut worms: slender, earthworm-like nemerteans of various descriptions; many-legged annelid worms; and hardy bivalves.

Sand

Because sand is more porous than mud, it is a better surface for many burrowers, a better surface for a wider number of animals to live on and in. On a sand flat at low tide one may find starfish, sea urchins, and numerous kinds of crabs and snails. Some of these animals wander over the sand flats when they are submerged, scouring them for bits of food. Some crabs, like the Dungeness, tend to stay in sandy areas because of the methods of self-protection involves burrowing into the sand to hide. (Even when the sand is exposed, watch for depressions in the surface that mimic the shape of the crab's shell. By digging there, you may uncover a crab that stayed buried even as the water receded.) By looking for clam or cockle siphon holes, you will discover these common residents of sandy areas and by digging carefully you may unearth them.

Cobbles and Boulders

Obviously, the size of loose rocks on the beach may range from something just a bit coarser than sand up to boulders too large to be lifted. In general, the larger the general size of the rock pieces, the greater variety of life one might expect to find there. The more stable the hard surface is, the greater protection and anchors it can afford a resident plant or animal. Intertidal areas of cobbles or rocks are often most obviously serving as anchorages for marine plants (most common in the Juneau area, Fucus, the rockweed, the tough, ubiquitous, brown plant with the bulbous reproductive bodies that kids like to pop) and for barnacles and blue mussels that may cover certain rocks of sections of beach in great density. If you begin to look down among the beds of rockweed, barnacles, and mussels and UNDER cobbles and boulders, you will discover an amazing diversity of life forms. Small six-rayed starfish cling beneath medium sized rocks, often brooding clutches of eggs. Blennies up to six inches or so in lenth (one of the two most common intertidally discovered fish) hide under rocks. So do amphipods or sand fleas and tiny crustacean beach scavengers that quickly seek new cover when discovered under their protective rock. Clinging to the surface of the rocks may be limpets, chitons, sponges. Look for the latter particularly under overhangs of larger rocks.

Because of their ability to serve as anchors and because they offer so many protective niches, rocks on beaches afford some to the best looking places. Don't neglect to have along a magnifying glass so you can really see some of the tiny critters! Guaranteed that the more your look, the more you will see there! Just be very sure that after you turn over a rock to reveal its underside residents, that you replace it so the animals don't dry out and perish!

Bedrock

This is just as exciting a place to poke as cobbles/boulder areas and many of the same inhabitants can be found here - with two general kinds of exceptions. First, obviously this rock surface can't be turned over so the "rock and sand or mud residents" are not here. Second, it is in bedrock areas that you are most apt to find remnant puddles of water - tidepools - that may harbor lots of life, including small anemones with tentacles extended to trap food (they come in a wide variety of gorgeous color combinations), rock hard coralline algae that looks like hard, pink plaster but are actually living plants, tiny immature sculpins, and perhaps little shrimp. Be sure to look carefully in crevasses for sponges, starfish, and other creatures.

THE DISTANCE FROM THE WATER

Each species of marine plant and animal has a particular tolerance to being out of salt water. Some of them, for example, are never found intertidally because they have absolutely no tolerance for exposure to the effects of an air environment. Others can stand being out of salt water for extended periods of time, needing only to be wet by the sea on occasional very high tides. By looking at the beach in a section from its highest high water mark down to the water level on a low, low tide, you can quickly begin to see major differences in plant and animal populations.

The Highest Fringe

At the upper limits of the intertidal zone, least life forms are evident. You may notice that the rocks appear black here. This is because they are covered by a black encrusting lichen or by a blue-green algae that makes these rocks treacherous and slippery when wet. In these upper reaches, too, may be found the common tiny periwinkle - a fat, ridged snail that sometimes seems to pepper the rocks.

The Middle Zone

As you move down toward the water's edge on a low tide, you will be aware of obvious color bands or patches on the beach. There may be banding of Fucus, the common brown rockweed, and of blue-black mussels (the intertidal - and subtidal - bivalve that attaches itself by tiny threads to rocks and pilings and other surfaces), and barnacles. Here too you will begin to see limpets (the species of which are sometimes most quickly identified by how low or high they are found on the beach), amphipods, various starfish, tiny black sea cucumbers, and other forms of life there were not in evidence at higher levels.

## The Lowest Zone

As you approach the water's edge, you will not find some of the plants and animals that were evident at higher levels. In general, however, the lower you go in the intertidal zone the greater the diversity of life forms you will find. Here you will find sea urchins, a wide variety of often large starfish, perhaps juvenile king crabs, large white or varicolored sea anemones (if they are out ot water, these will look like squishy, uninviting blobs, but look out into the shallow waters to see the same animals in all their expanded glory), and the larger snails.

So...as you look at any particulat beach for the first time, there is a great deal to think about. Remember that each part of the beach, each kind of surface type, each height from the water, each kind of topographical variation indicates what life may be found there. In general, it is advisable to spend the lowest part of the tidal cycle closest to the water's edge for in that way you will have the maximum amount of time to spend along the beach area that is revealed to us least often and which tends to harbor the greatest diversity of plants and animals.

If you can, acquaint your students with these obvious or subtle variations in the beach habitat for it will enrich their beach experience, too!!!

# TIDES

Students can understand some basics about tides and should definitely learn that the height of the water on the beach varies with the stage of the tide and that maximum and minimum tidal levels vary each day.

Tides, in a very simplified kind of explanation, occur because of the gravitational pull of the sun and the moon on the earth. Just as the earth exerts gravitational force (why does an apple fall? why can't we step off into space?), so do these other two bodies. The force of the pull of the sun and moon on a particular place on earth depends on how directly they are in line with that place. The force they exert tends to pull the water away from the earth's surface on the side of the earth facing,thus causing a high tide. Because the relative position of the sun, earth, and moon are constantly changing in a cyclic rhythm, so are the tides.

## Activities

Here in Southeast Alaska we experience a tidal cycle that consists of two unequal high tides and two unequal low tides each day. With some students in primary grades and all those in upper grades, you might sit down with a tide table and look at the numbers and explain what they mean. You might even make a simple chart of tide levels and of activities to coincide with various stages of the tide. For instance, it might be much easier to launch a boat when the tide is high but digging clams can best be done on the very lowest tide. Students might be shown the same beach at high and at low tide and through words or art work compare the differences.

## Preparation for Field Trip

In preparing for the field trip, discuss tides with the students. Mention the need to be as close to the water as possible when the tide is at its lowest in order to see that strip of beach and the life that is there, for the water quickly comes in and covers it. Talk, too, about the need to be aware of the tide level and thus not to set a pack or bucket next to the water's edge and expect to find it there later if the tide is flooding.

As a teacher you need to be aware of the time of low tide when scheduling your field trip to the beach and in planning the activities that will take place there. The time of very lowest tide should be kept open for observation of what is to be found in the zone nearest the water. Activities such as taking a break for a snack or gathering around buckets to discuss and examine particular animals should occur when the tide is ebbing or flooding.

# A BIBLIOGRAPHY OF HELPFUL REFERENCES

## Field Guides

Abbott, R. T. 1968. *Seashells of North America.* Golden Press, New York. 280 pp. $3.95.

Ayres, J. and D. McLachlan. 1979. *Fieldbook of Pacific Northwest Sea Creatures.* Naturegraph Publishers, Inc. Happy Camp, California. 208 pp. $10.00.

Furlong, M. and V. Pill. 1973. *Edible? Incredible!* ERCO, Inc., Tacoma, Washington. 62 pp. $2.50.

_____. 1973. *Starfish - Guides to Identification and Methods of Preserving.* ERCO, Inc., Tacoma, Washington. 104 pp. $3.50.

Guberlet, M. L. 1956. *Seaweeds at Ebb Tide.* University of Washington Press, Seattle. 182 pp. $4.95.

Hosie, R. C. 1969. *Native Trees of Canada.* Information Canada, Ottowa. 380 pp. $7.20.

Kozloff, E. N. 1974. *Keys to the Marine Invertebrates of Puget Sound, the San Juan Archipelago and Adjacent Regions.* University of Washington Press, Seattle. 266 pp.

Madlener, J. C. 1977. *The Seavegetable Book.* Clarkson N. Potter, Inc., New York. 288 pp. $6.95 (recipes!).

McClane, A. J. 1978. *Field Guide to Saltwater Fishes of North America.* Holt, Rinehart and Winston, New York. 283 pp.

Murie, Olaus J. 1975. *A Field Guide to Animal Tracks.* Moughton Miffin Co., Boston. 375 pp. $6.95.

Murray, C. and D. Somerton. 1976. *Field Guide to the Fish of Puget Sound and the Northwest Coast* (printed on waterproof paper). University of Washington Press, Seattle. 70 pp. $5.95.

Rice, T. 1973. *Marine Shells of the Pacific Coast.* ERCO, Inc., Tacoma, Washington. 102 pp. $2.95.

Robbins, C. S., B. Bruun, and M. S. Zim. 1966. *Birds of North America.* Golden Press, New York. 340 pp. $4.95.

Smith, L. S. 1976. *Living Shores of the Pacific Northwest.* Pacific Search Press, Seattle. 149 pp. $9.95.

Viereck, L. A. 1974. *Guide to Alaska Trees.* United States Forest Service, Washington, D. C. 98 pp. $1.35.

Waaland, J. R. 1977. *Common Seaweeds of the Pacific Coast.* Pacific Search Press, Seattle, Washington. 120 pp. $5.95.

Marine Mammals

Graves, J. A. 1977. *What is a California Sea Otter?* Boxwood Press, Pacific Grove, California. 30 pp. $3.50.

McDearmon. 1974. *The Walrus - Giant of the Arctic Ice.* Dodd, Mead, and Co., New York. 45 pp. $4.25.

Proctor, S. J. 1975. *Whales - Their Story.* Vancouver Public Aquarium Association Newsletter vol. XIX no. 4, July/ August 1975. Vancouver, British Columbia, Canada. 14 pp.

Slijper, E. J. 1976. *Whales & Dolphins.* The University of Michigan Press. 170 pp.

Stonehouse, B. 1976. *A Closer Look at Whales and Dolphins.* Gloucester Press, New York. 31 pp. $1.95.

Fish

Burton, Dr. M. 1972. *The Life of Fishes.* Golden Press, New York. 61 pp. $2.95.

Childerhose, R. J. and M. Trim. 1979. *Pacific Salmon.* University of Washington Press, Seattle. 158 pp. $24.95.

DeCarli, F. 1978. *The World of Fish.* Abbeville Press, New York. 256 pp. $6.95.

Hart, J. L. 1973. *Pacific Fishes of Canada.* Fisheries Research Board of Canada, Ottowa. 740 pp. $14.40.

Birds

Bradbury, W. 1976. *Birds of Sea, Shore, and Stream.* Time Life Films, Inc. 128 pp. $8.95.

Ecology

Adams, R. 1978. *Nature Day and Night.* Viking Press. New York. 107 pp. $10.00.

British Museum of Natural History. 1978. *Nature at Work.* British Museum, London. 84 pp. $4.95.

Carefoot, T. 1977. *Pacific Seashores.* University of Washington Press, Seattle. 208 pp. $14.80.

Activities

Cornell, J. B. 1979. *Sharing Nature With Children.* Ananda Publications. 142 pp. $4.95.

Curriculum Research and Development Group - University of Hawaii. 1976. *Reef and Shore - Hawaii Nature Study Program for Elementary School Children, Teachers' Guide.* University of Hawaii, Honolulu. 265 pp.

Lien, V. 1979. *Investigating the Marine Environment and Its Resources.* Sea Grant College Publications, Texas A and M University, College Station, Texas 17843. 439 pp. $8.00

Mauldin, L. and D. Frankenberg. 1978. *North Carolina Marine Education Manual* (4 volumes). UNC Sea Grant Publication UNC-56-78-14-A, North Carolina State Univesity, Raleigh, North Carolina 27607.

Oceanography

Bascom, W. 1964. *Waves and Beaches: the Dynamics of the Ocean Surface.* Doubleday and Company, Inc., Garden City, New York. 267 pp. $2.50.

Scientific American. 1969. *The Ocean.* W. H. Freeman and Company. 140 pp. $3.25.

Issues

Ball, J. L. Jr., T. Frady, and R. S. Lee (eds). 1977. *Readings From Alaska Seas and Coasts.* Alaska Sea Grant Program, Fairbanks. 252 pp.

Browning, R. J. 1974. *Fisheries of the North Pacific: History, Species, Gear, and Processes.* Alaska Northwest Publishing Company. Anchorage. 408 pp. $24.95.

Drucker, P. 1963. *Cultures of the North Pacific Coast.* Chandler Publishing Company, Scranton, Pennsylvania 243 pp.

Figdor, S. and G. 1978. *Salmon Fishing* (one of a children's series of people at work in Alaska). George Figdor, Haines, Alaska. 48 pp. $7.95.

Kramer, L. S., V. C. Clark, and G. J. Cannelos. 1978. *Planning for Offshore Oil Development: Gulf of Alaska OCS Handbook.* Alaska Department of Community and Regional Affairs, Division of Community Planning, Juneau. 257 pp.

Miscellaneous and General References

Alaska Dept. of Fish and Game. *Wildlife Notebook Series. (fish species and crabs)* Juneau.

Angel, H. 1976. *Life in the Oceans.* Cathay Books, London. 125 pp. $6.66.

Angel, T. and Harris. 1977. *Animals of the Oceans.* Two Continents Publishing Group, New York. 156 pp. $10.95.

Berrill, N. J. 1966. *The Life of the Ocean.* McGraw-Hill Book Company, New York. 232 pp. $7.50.

Calvin, J. and E. Ricketts. 1968. *Between Pacific Tides.* Fourth Edition. Stanford University Press, California. 614 pp. $12.50

Flora, C. J. and E. Fairbanks, M.D. 1977. *The Sound and the Sea: A Guide to Northwestern Neritic Invertebrate Zoology.* Washington State Dept. of Printing, Olympia. 474 pp. $8.50.

Johnson, M. E. and H. J. Snook. 1927. *Seashore Animals of the Pacific Coast.* McGraw-Hill, New York. 523 pp.

Tyler, J. 1976. *The Children's Book of the Seas.* Usborne Pub. Ltd., London. 32 pp. $2.95.

United States Forest Service. *Beach Camping* and other informative publications. Juneau.

University of Alaska. Alaska Sea Grant Program. *Alaska Tidelines*, a Sea Grant Publication for Alaska Schools. Fairbanks.

Plus +++ check with agencies in your area, aquaculture associations, the U. S. Coast Guard, local corporations to see what publications they may have available.

## OTHER LEARNING AIDS

The Alaska State Museum has multi-media learning kits available for use by Alaskan schools, including a Salmon kit. Priority use is given to bush schools. Write: Alaska State Museum, Pouch FM, Juneau, Alaska 99811.

Your school can order films through the Alaska State Film Library. Their marine science/oceanography listings are too numerous to mention, but some topics that are dealt with include: marine invertebrates, ocean currents, the beach, whales, life cycle of the salmon, mollusks, tide pool life, marine science careers, sea birds, octopus, the ocean as a food source, fishing techniques, the ecology of the ocean, and seacoast cultures.

The Smithsonian Institution is currently field testing a binder of estuary study activities ($9.68). Activities include: Beachcombing, Mapping, Barnacles, Build A Trap, Fish Adaptations, Fish, Marsh Muck, Crabs, Water in Motion, Menance Oil Slick, Oil Spill Cleanup, and Estuary 3-D Board. For more information write:

SEA (Smithsonian Estuarine Activities)
Chesapeake Bay Center For Environmental Studies
Smithsonian Institution
P. O. Box 28
Edgewater, Maryland 21037

Posters on beach safety and pamphlets on tides, whales, crabs, and other marine topics are available from the Oregon State University Sea Grant Marine Advisory Program. For a catalog and price list (many are free) write:

Extension Communication-Marine Advisory Program
Oregon State University AdS 422
Corvallis, OR 97331

ALASKA SEA WEEK EVALUATION FORM

computer code numbers

1. Town or village _____ (1-4) (5)

2. Grade level _____ (6-7)

3. Number of students involved _____ (8-10)

You may need to review your Alaska Sea Week materials to answer these questions.

4. How many classroom (indoor) activities and worksheets did you use from each book?

| Book (Grade level) | Number of activities | |
|---|---|---|
| Discovery (K) | _____ | (11-12) |
| Sea Animals (1) | _____ | (13-14) |
| Shells (2) | _____ | (15-16) |
| Glacial & Intertidal Ecology (3) | _____ | (17-18) |
| Birds (4) | _____ | (19-20) |
| Fish (5) | _____ | (21-22) |
| Man's Influence on the Sea (6) | _____ | (23-24) |

5. What is the total number of field (outdoor) activities used from the 7 books? _____ (25-26)

6. How many periods (1 hr. each) did your class spend on the Sea Week Program? _____ (27-29)

Please check the appropriate box to the right of each question.

| | decidedly yes | yes | no opinion | no | decidedly no | |
|---|---|---|---|---|---|---|
| 7. Were the Alaska Sea Week materials relevant to your curriculum? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (30) |
| 8. Did the Sea Week materials motivate students to improve their math, reading, & writing skills? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (31) |
| 9. Did the Sea Week materials upgrade your science program? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (32) |
| 10. Did students enjoy the Sea Week activities? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (33) |
| 11. Did students develop a greater awareness, appreciation, and respect for the sea? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (34) |
| 12. Did students develop decision-making skills necessary for resolution of marine issues? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (35) |
| 13. Was the material appropriate for your students' grade level? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (36) |
| 14. Was the teacher background section adequate? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (37) |
| 15. Were the teacher instructions helpful & complete? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (38) |
| 16. Were parents and other community members involved in your Sea Week? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (39) |
| 17. Were parents favorably impressed with the Sea Week Program? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (40) |
| 18. Did Sea Week help improve the relationship of the school to the community? | ___(1) | ___(2) | ___(3) | ___(4) | ___(5) | (41) |

19. Rate your overall feelings about the Sea Week MATERIALS on a scale of 1 to 5. _____ (42)
(1=high; 5=low)

20. Rate your overall feelings about the Sea Week PROGRAM on a scale of 1 to 5. _____ (43)
(1=high; 5=low)

(OVER, PLEASE)

21. How many teachers are in your school? _____
How many are using Sea Week materials? _____ (44-45)

22. Do you plan to introduce the Sea Week materials to other teachers? yes____(1)
no____(2) (46)

23. Do you plan to use the Sea Week materials again? yes____(1) no____(2) (47)

24. Would you be interested in attending a marine education/Sea Week workshop?
yes____(1) no____(2) (48)

If so, list your name and school address:

Name _____

Address _____

25. What other comments do you have? Are there any specific improvements you would suggest?

Please return this completed form to Jill Thayer/Belle Mickelson, Alaska Sea Grant Program, University of Alaska, Fairbanks, Alaska 99701.